Socio-Economic Assessment of the Recovery Plan for Grizzly Bears in the North Cascades of British Columbia

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In developing the socio-economic estimates prepared for this study, the consultants have made several forecasts and assumptions utilizing information gathered under the time and resource constraints imposed on this study. These forecasts and assumptions are thought to be reasonable and suitable for the purposes of this analysis, but should not be relied upon for other purposes.

The North Cascades grizzly bear population unit boundaries do not, in general, coincide with management unit boundaries for the resource values potentially impacted by the Recovery Plan. It has therefore been very difficult to source baseline data and assess impacts of the Recovery Plan on these resource values. In undertaking this task, the consultants have been required to make estimates of the socio-economic significance of resource values and associated activities in the Recovery Plan Area, based on data from much broader or much narrower geographic areas or management jurisdictions.

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EXECUTIVE SUMMARY

The North Cascades Grizzly Bear Recovery Plan (the Recovery Plan) area covers approximately 9,800 square kilometres in southwestern B.C. between the Fraser Valley and the Okanagan Valley. The Recovery Plan aims to restore the North Cascades Grizzly Bear Population Unit (GBPU) from the existing "threatened status" to a "viable" status.

This socio-economic assessment assumes that the management objectives and direction outlined in the Recovery Plan can and will be applied and enforced in the Recovery Plan area. No attempt has been made to assess the likelihood or feasibility of implementing management initiatives.

The extent to which the Recovery Plan achieves ecological objectives is not addressed in this assessment.

The Recovery Plan area falls within traditional First Nations Territory. In the course of this assessment, no effective facility or mechanism was established to gather information on how the Grizzly Bear Recovery Plan may impact First Nations' interests and no assessment of those impacts is therefore attempted.

Main Elements of the Recovery Plan

The Recovery Plan comprises three broad types of initiatives:

1. Habitat protection/enhancement initiatives include a variety of strategies for timber harvesting, silviculture and range management, as well as provision for ongoing access management planning.

2. Population augmentation initiatives include the translocation of grizzly bears from other population units to enhance genetic diversity and contribute to growth of the North Cascades grizzly bear population unit.

3. Public education initiatives are intended to reduce the potential for human/grizzly bear conflicts, reduce the incidence of accidental grizzly bear mortality and garner public support and cooperation in the implementation of the recovery plan.

The Recovery Plan area covers some 9,800 square kilometres of area southeast of the Fraser River between Chilliwack and Keremeos, and extending north to Lytton on the east side of the Fraser Canyon. A central subset of this area, comprising some 6,250 square kilometres, and called the "Spine " in the Recovery Plan is the focus of the habitat protection/enhancement initiatives outlined in the plan. This assessment considers potential socio-economic impacts from both the broad initiatives which apply to the entire Recovery Plan area, and from those which apply to the Spine area exclusively.

Habitat preservation/enhancement initiatives will likely have the greatest socio-economic impact implications of the three broad initiative types. Alterations to management for forestry, rangeland, and recreation may be required in the Spine area to accommodate grizzly bear recovery initiatives. In addition, access management may affect a broad cross-section of interests and values, including those noted above as well as mining and backcountry tourism.

While the Recovery Plan calls for access management planning, and prioritizes landscape units within the Recovery Plan area, specific access management plans have not yet been developed. The stated intent is to develop these plans in consultation with stakeholders so as to minimize any adverse socio-economic impacts. This assessment can therefore make only very general observations on the potential impacts of access management plans, and on the socio-economic significance of values that may be affected. While access management plans may be concerned to some degree with the 'distribution' of access rather than the total 'quantity' of access, the underlying presumption in this assessment is that access management will lead to less motorized backcountry access than might otherwise occur. These habitat protection/enhancement initiatives will be undertaken only in the central Spine area of the Recovery Plan area, which covers just less than two thirds of the total GBPU area.

Population augmentation, coupled with the general objective of the plan to increase the grizzly bear population in the North Cascades, is of concern to anyone exposed to any real or perceived increased risk of unwanted human/grizzly bear or livestock/grizzly bear contact. Release of translocated grizzly bears will occur only in the Manning landscape units, which are located in the south central portion of the Spine.

Socio-Economic Assessment

By sector and/or activity, the Recovery Plan impacts are assessed as follows:

Description of Socio-Economic Significance	Recovery Plan Impacts

MINING
• The Recovery Plan area has 59 past producing mines including gold, copper, coal & other; there are currently no operating mines other than 2 granite quarries and one small other.
• Minimal current annual job impact, estimated at approximately 16 direct PYs (10 PYs in mineral exploration and 6 PYs at quarries & small operating mines).
• North Cascades as a percentage of B.C.:
  • 1.0% of B.C. land area
  • 3.3% of mineral occurrences in B.C.
  • 2.5% of mineral tenures in B.C.
  • 3.6% of placer tenures in B.C.
  • 1.6% of coal tenures in B.C.
	• The Recovery Plan acknowledges the two-zone system for mining in the Recovery Plan Area.
	• Access management planning will likely reduce the density of roads in the Spine area from the density that might otherwise occur, thereby potentially reducing the amount of mineral bearing land that is easily accessible for geological exploration.

ENERGY • Some coalbed methane potential in Tulameen and Princeton coalfield (0.1% of coalbed methane potential in B.C.) • Good potential for small hydropower projects (2 out of 16 small 2002/2003 BC Hydro approved independent projects are in North Cascades).	• The Tulameen and Princeton coalfields are already fairly accessible by roads and should not be significantly affected by the Recovery Plan should there be interest in developing the coalbed methane resources or coal deposits. • No information was readily available on potential impacts of the Recovery Plan on the potential for small hydro projects in the North Cascades Recovery Plan area.
FORESTRY • Recovery Plan area covers a Timber Harvesting Land Base (THLB) of 416,466 hectares (1.8% of B.C.'s THLB of 23 million hectares)[1] supporting approximately 1.2 million m3 of AAC.	FORESTRY IMPACTS • Harvest volume impact in the Spine area should be very limited if the Recovery Plan is carefully implemented, and most of that limited impact is

[1] Pierce Lefebvre Consulting et al., *Socio-Economic Impact Assessment of the Provincial Government's Strategic Land Use Plans on Key Sectors in B.C.*, 2001, page 23.

Description of Socio-Economic Significance	Recovery Plan Impacts
• Total direct annual employment related to timber harvesting and processing is estimated at 1,353 direct PYs. • Direct government revenue (stumpage) is estimated at $23.5 million per year. • The Spine of the Recovery Plan area covers 255,953 hectares (or 1.1% of B.C.'s THLB) and supports 758 direct PYs of employment and $13.8 million in government revenues each year.	already budgeted for under Forest Practices Code implementation in the most recent TSA timber supply analyses. • There are likely to be some minor harvesting and silviculture cost increases in the order of 1% or 2% of the stumpage revenue generated by timber harvesting activity in the Spine Area ($150,000 to $300,000 per annum). • There may be some increase in local and international public confidence that timber harvesting on crown forest lands can proceed while nurturing a grizzly bear population unit.
TRANSPORTATION • Over 20,000 vehicles travel through the North Cascades on three major highways on a daily basis during the peak season, in the summer months.	• No impact on traffic patterns expected. • Some modest traffic calming or traffic advisory initiatives may be considered in certain areas to support plan objectives.
AGRICULTURE • Recovery Plan area accounts for 47,452 Animal Unit Months (AUMs) of livestock grazing, 81% are in the Spine and 19% are outside the Spine. • Based on the AUMs, the beef cattle industry in the North Cascades generates range fees of $105,802 and 397 PYs of direct employment. • The B.C. Wild Predator Loss Control and Compensation Program reports no incidents of livestock losses in the North Cascades over the last year. Livestock losses for B.C. are estimated at approximately $1 million (based on $60,000 in claims, accounting for between 5% and 8% of all livestock losses from wildlife). Wolves and black bears account for most claims, but there are some grizzly bear incidents.	• The slow increase in the number of grizzly bears to 150 as proposed in the Recovery Plan may result in relatively minor additional livestock losses once the population has recovered (estimated to average between $1,000 and $5,000 per year). Various government and industry-funded programs help compensate ranchers and farmers against predator losses. • Any infringement on crown range grazing tenures to accommodate grizzly bear habitat will proportionately reduce cattle ranching potential in the Spine area.

RECREATION AND TOURISM
Provincial Parks, Other Protected Areas and Recreation Areas:
• The major Provincial Parks and other protected areas include E.C. Manning, Cathedral, Skagit Valley and Chilliwack Lake Provincial Parks, as well as the Snowy Protected Area.
• These cover some 20% of the Recovery Plan area, account for 1.5 million park visits, and generate 583 Person Years of direct, indirect and induced employment every year through park operations and related visitor spending.
• Percentage of B.C.:
  • 1.7% of Protected & Recreation Areas in B.C.
  • 5.3% of B.C. campsites in Provincial Parks
  • 6.4% of all B.C. visits to Provincial Parks
Provincial Forests:
• Offer non-motorized activities available in Provincial Parks, but also offer motorized activities such as snowmobiling and backcountry driving.
• Recreation in provincial forests in B.C. generates similar visitation rates as parks and would likely result in similar socio-economic impacts.
	• The Recovery Plan bear awareness program may reduce conflicts with black bears, as well as grizzly bears.
	
	• The most important impact on recreation will likely be on future motorized recreation opportunities such as ATVs and backcountry driving, and access to parts of the Spine area that are not already heavily roaded.
	
	• There may also be some trails that are re-routed or closed for certain key periods due to specific grizzly bears activities.

Description of Socio-Economic Significance	Recovery Plan Impacts
Selected Recreation Activities: • Hunting effort: North Cascades is a convenient hunting area for B.C. residents accounting for 27,245 hunter days; the Recovery Plan area accounts for 5% of all mule deer hunter days by B.C. residents and 3% of black bear hunter days by B.C. residents. • Angling: In the Thompson Nicola/Kamloops region, the most popular area for angling is outside the Recovery Plan area, east of Tulameen, Coldwater River and the North Cascades area. There are nevertheless many rivers, streams and small lakes supporting substantial angling activity. • Snowmobiling: This is a popular winter recreation activity in the North Cascades provincial forests, with expenditures by snowmobile tourists ranging between $85 and $225 per day.	
Commercial backcountry operators: • Guide outfitters: average annual non-resident hunting effort for the Recovery Plan area accounts for 201 hunter days (0.4% of total for B.C.). • There are approximately 12 adventure travel operators who may be offering tours in the Recovery Plan area including 4 river rafting tour operators, 4 guest ranching operators, 2 operators offering winter tours, and 2 others. This excludes commercial lodges and accommodation.	• If the grizzly bear population in the North Cascades reaches 150, this implies a grizzly bear density of 15 grizzly bears/1000 sq km which is much higher than the existing density of 2 grizzly bears/1000 sq km, but is much lower than grizzly bear densities in other popular recreation and tourism areas in the Kootenays. It is therefore unlikely that the greater grizzly bear densities would lead to negative impacts on backcountry tourism in the region. • The Recovery Plan augmentation program is unlikely to result in any significant increase in tourism activity as it is not expected that any specific area would attract a sufficiently high concentration of grizzly bears to justify grizzly bear viewing tours to that area.
FIRST NATIONS: • There are 20 First Nations in the area and an estimated 2,658 First Nations people residing on 48 Indian Reserves. • Indian reserves account for 156.5 square km, or 1.6% of the Recovery Plan area land base. • The Recovery Plan area is comprised of lands with a long history of traditional use by First Nations.	• Many of the habitat protection measures intend to limit further road development and the erosion of grizzly bear habitat in the North Cascades. Limiting further road development may assist in protecting traditional First Nations values. • In the course of this assessment, no effective mechanism was established to gather information on how the Recovery Plan might impact the interests of First Nations in the area, and no assessment of those impacts is therefore attempted.
SETTLEMENTS: • The communities of Hope, Boston Bar, Lytton and Princeton have a combined population of approximately 9,500 permanent residents. These and other communities in and near the Recovery Plan area are all on the boundary of the Spine plan area except for Eastgate and Othello. • The small communities that are closest to core grizzly habitat such as Eastgate, Othello, the Sunshine Valley, Tulameen and Coalmont are very small, with some having fewer than 50 residents. Together these have a combined population of up to 500 permanent residents.	• Given the intended very slow build-up of grizzly bear population levels, and the modest density that is likely to be ultimately achieved, there should be no specific impact to communities from augmentation initiatives. There may be some increase in public anxiety over real or perceived increases in the risk of unwanted grizzly bear encounters. • The magnitudes of any economic impacts resulting from the Recovery Plan are expected to be too small to affect the viability or functioning of any communities.

Conclusions

The North Cascades Grizzly Bear Recovery Plan is mandated to move the status of the grizzly bear population unit from 'threatened' to 'viable', without imposing significant new impediments to land and resource access in the North Cascades region.

There are three main types of management initiatives outlined in the Recovery Plan including habitat preservation/enhancement, population augmentation, and public education.

The public education initiatives are expected to have generally positive socio-economic implications, in helping to minimize the potential for human/bear or livestock/bear conflicts, not only for grizzly bears, but for the much larger black bear population as well. The only potential negative socio-economic consequence (other than the cost of implementation) is any unintended increase in public anxiety over the potential for grizzly bear encounters.

Population augmentation (translocation) initiatives are to be gradually phased in, with very small annual population increments once the initiatives are fully implemented. Any negative socio-economic implications of population augmentation are expected to be extremely minor until a substantial cumulative change has occurred in the population total. Even if a population of 150 bears is achieved, the population density will be at the lower end of the range of population densities in BC grizzly bear population units. There is little evidence that human/grizzly bear or livestock/grizzly bear conflict presents a major problem at these density levels.

Public perception of the risks of unwanted grizzly bear encounters will not necessarily change in proportion to the actual change in this risk level, and there may be little tolerance for any real or perceived increase in this risk level, regardless of how small it actually is. Accordingly, the population augmentation initiatives may cause some increase in public anxiety over the possibility of unwanted grizzly bear encounters.

Habitat preservation/enhancement strategies in the Recovery Plan, including as yet unspecified access management plans, have the greatest potential for negative socio-economic consequences, but these impacts are expected to be very small. For timber harvesting, there will likely be some modest harvesting and silviculture cost increases in some areas, as well as some additional constraints within which to manage timber supply. The timber supply constraints are not, on their own, expected to be significant enough to cause alteration to the allowable annual cut in any of the three timber supply areas that extend into the Recovery Plan Spine area.

Other impacts of the habitat preservation/enhancement strategies may include small reductions in the amount of Crown land available for cattle grazing, some constraint on future levels of accessibility to lands for mineral exploration, and some constraints on access to backcountry wilderness for various recreation activities. These values are very significant to the area and to the province, and implementation of the habitat strategies, including access management planning, will require care to avoid significant impacts on these values. The Recovery Plan indicates that stakeholder participation/consultation processes will be employed during plan implementation to avoid any unintended negative impacts on these and other values.

1 Introduction

This section reviews the general objectives and intent of the Recovery Plan for Grizzly Bears in the North Cascades (the North Cascades Recovery Plan) and provides an overview of the methodology suggested by MSRM for socio-economic assessments.

1.1 Recovery Plan Objectives

The North Cascades Recovery Plan aims to restore the North Cascades Grizzly Bear Population Unit (GBPU) from the existing "threatened status" to a "viable" status. The objectives for achieving this goal include:

1. Provide habitat of sufficient quantity and quality to support a viable population.
2. Prevent population fragmentation and maintain genetic diversity.
3. Increase the number of grizzly bears.
4. Minimize the potential for grizzly bear/human conflicts.
5. Minimize human-caused mortality of grizzly bears.
6. Increase public knowledge of, and support for, grizzly bear recovery.
7. Facilitate interagency cooperation and management.

The Recovery Plan suggests that "the current estimated minimum habitat capability for the Recovery Plan area is 293 grizzly bears" [2], which translates to a density of 30 grizzly bears per 1000 km^2. Also noted in the plan, "achieving viable population status requires a population greater than 50% of a GBPU's estimated minimum habitat capability"[3]. For the Recovery Plan area, achieving viable population status therefore translates to half of 293 grizzly bears, or approximately 150 grizzly bears and a density of 15 bears per 1000 km^2.

The following chart shows grizzly bear density data for several well known Grizzly Bear habitat areas (population units) in the B.C. Interior.

[2] North Cascades Grizzly Bear Recovery Team, *Recovery Plan for Grizzly Bears in the North Cascades of B.C.*, 2003. (page 14)
[3] Ibid, page 14.

Chart 1 Grizzly Bear Density for Selected GBPUs in B.C.

Note: NC= North Cascades grizzly bear population unit.
Source: B.C. Ministry of Water, Land and Air Protection; Appendix 1 provides grizzly bear density data for every GBPU in B.C.

This analysis assesses the socio-economic impacts on the province of potential changes in North Cascades resource use resulting from the proposed Recovery Plan. Major assumptions applied throughout this analysis include:

1. That the management initiatives and direction outlined in the Recovery Plan can and will be applied and enforced in the Recovery Plan area. No attempt has been made to assess the likelihood or feasibility of implementing management initiatives.

2. That the impacts assessed are those related to the use, enjoyment or existence of Recovery Plan area resources. No attempt has been made to assess the degree to which resource use in areas adjacent to, or otherwise outside of, the Recovery Plan area might adjust to changes in resource use in the Recovery Plan area.

3. Socio-economic impacts from the Recovery Plan will be felt both inside and outside of the North Cascades area, and are assessed in this analysis at the provincial level.

The Recovery Plan area covers some 9,800 square kilometres of area southeast of the Fraser River between Chilliwack and Keremeos, and extending north to Lytton on the east side of the Fraser Canyon. A central subset of this area, comprising some 6,250 square kilometres, and called the "Spine " in the Recovery Plan is the focus of the habitat protection/enhancement initiatives outlined in the plan. This assessment considers potential socio-economic impacts from both the broad initiatives which apply to the entire Recovery Plan area, and from those which apply to the Spine area exclusively.

1.2 MSRM Methodology for Socio-Economic Assessment

MSRM, in collaboration with *Pierce Lefebvre Consulting*, has prepared Guiding Principles to help assess the socio-economic impacts associated with land use planning[4]. While a grizzly bear recovery plan is not a land use plan, these Guiding Principles are applicable in helping to structure an analysis of the potential impacts of such plans. The socio-economic and environmental implications of management plans can be assessed from a number of perspectives:

1. Benefit-cost analysis estimates the differences in net value of the market and non-market outputs generated by the plan and/or each scenario from a pure "economic efficiency" or "net resource value" perspective.
   - For commercial sectors, the net resource value (or economic rent) represents the above-normal financial returns from a commercial activity that occur as a result of the product or service generated by that activity being in relatively fixed supply relative to demand. Rent can accrue to the entrepreneur, be captured by the land and/or resource owner (government) or be incorporated in wages paid to labour.
   - For non-commercial activities such as recreation and the benefits associated with environmental resources, the net benefits fall into two categories: use-related values (e.g. recreation, food gathering, air and fresh water) and existence-related values.
2. Environmental risk assessment estimates the changes in likelihood of adverse environmental impacts resulting from human activities.

3. Economic impact analysis estimates impacts of the plan and/or scenarios on income and employment within specific communities, regions, or the Province as a whole.

4. Social impact analysis identifies and evaluates impacts of the plan and/or scenarios on demographic, local government and community concerns.

Each of these perspectives alone addresses only specific aspects of the consequences of a plan. The objective of socio-economic and environmental assessments is to review the complete array of social, economic and environmental impacts from a plan and present the information in tabular or matrix format to facilitate the review of the information by decision makers.

This report is concerned only with the social and economic impacts associated with the Recovery Plan for grizzly bears in the North Cascades and specifically, does not address potential environmental impacts of the Recovery Plan. In addition, no attempt is made to assess the direct government costs associated with formulating, facilitating and implementing the Recovery Plan.

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[4] MSRM, *Socio-Economic and Environmental Assessment for Land and Resource Management Planning in British Columbia: Guiding Principles*, Draft for Discussion Purposes, January 2003.

2 Assessment of Recovery Plan Impacts on Industrial Sectors

2.1 Metals and Minerals

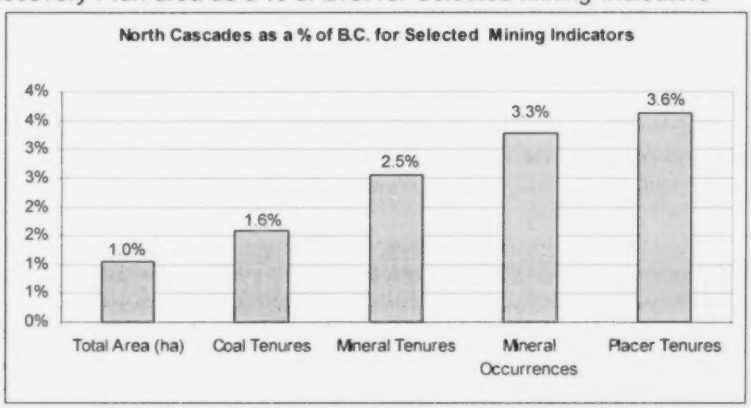
The mining industry has played a key role in the industrial development of the North Cascades area. The communities of Princeton, Coalmont, Tulameen, Hope, Yale, Boston Bar and Lytton all owe much of their history to the mining industry, dating back to the 19th and early 20th centuries.

The North Cascades area has been an important region of the province to the mining sector, with the Ministry of Energy and Mines (MEM) reporting 59 past producing mines in the area. MEM reports that there are 3 operating mines and quarries in the Recovery Plan area, which together are estimated to generate an estimated 6 Person Years (PYs) of direct employment.[5] Existing and past producing mines as well as developed prospects bring the number of mineral occurrences for the North Cascades to 394 occurrences, or approximately 3.3% of all mineral occurrences in B.C. [6] (compared to 1% of the total land area in the province).

There are also some construction aggregate quarries including one just east of Hope, one near Tulameen and one along the Coquihalla Highway. Highland Valley Copper, one of the largest copper mines in the world, is located in Logan Lake approximately 50 km north of the northern boundary of the Recovery Plan area.

The following chart shows the relative contribution of the Recovery Plan area to mining activity in B.C. for selected indicators.

Chart 2 Recovery Plan area as a % of B.C. for Selected Mining Indicators



Source: Based on 2001 MSRM data. Appendix 2 provides more detail.

The Recovery Plan area includes part of the Tulameen coalfield and the Princeton Coalfield. Approximately 4 million tonnes of coal were produced prior to 1961, with the production split between the two fields (by comparison, current annual coal production in B.C. is approximately

[5] Appendix 2 provides more detail.

[6] The B.C. data are from: Pierce Lefebvre Consulting et al., *Socio-Economic Impact Assessment of the Provincial Government's Strategic Land Use Plans on Key Sectors in B.C.*, 2001, Appendix 4.

25 million tonnes).[7] The B.C. Ministry of Energy and Mines reports that a major exploration program was undertaken on the Tulameen Basin in 1998 with promising results, and that Compliance Coal Limited is pursuing local markets for coal.

Total exploration expenditures for the Recovery Plan area are not readily available, but data from the MEM Assessment Report Index (ARIS) database show that between 1970 and 2002, exploration expenditures for the North Cascades have averaged $1 million per year after accounting for inflation ($2002), or 2.4% of total B.C. ARIS expenditures. Reported ARIS expenditures for the North Cascades region vary widely from year to year and they have dropped to $160,000 for 2002 (0.8% of ARIS expenditures for B.C.). Not all exploration expenditures in B.C. are included in the ARIS database, however, as between 1970 and 2002, the ARIS documented expenditures accounted for approximately 65% of B.C.'s estimated fieldwork and overhead exploration expenditures.

BC Stats estimates that every $1 million in exploration expenditures generates 9.6 Person Years (PYs) of direct employment and another 5 PYs of indirect employment as a result of purchases of goods and services required for exploration.[8] The annual employment impact associated with exploration expenditures in the North Cascades is therefore likely to average approximately 10 PYs of direct employment and another 5 PYs of indirect employment (based on 22 year average expenditures of $1 million, assuming that ARIS expenditures represent all exploration expenditures for the Recovery Plan). While the exploration expenditures themselves have fairly minor socio-economic impacts, the benefits associated with mineral exploration accrue mainly as a result of exploration being successful at identifying a mineable deposit.

The mining sector in the Recovery Plan area generates some 16 PYs of direct annual employment (6 PYs from operating mines and 10 PYs from mineral exploration) and an estimated net economic value (rent) to labour of $40,000 per annum. No estimates are available for industry rents and public sector rent, but they are assumed to be very modest.
Appendix 2 provides more detail on the socio-economic impacts from mineral activity in the Recovery Plan area.

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **METALS AND MINERALS EXPLORATION, DEVELOPMENT AND MINING**:

- In 2002, the B.C. Government legislated a two-zone system for mining along with a 'single-window' permitting process for exploration and development of mineral resources. The Recovery Plan acknowledges the two-zone system for mining in the Recovery Plan Area, stating that mineral exploration and development is permitted anywhere outside of protected areas, subject to measures to limit impacts on other values as outlined in the Mineral Exploration Code and mine development regulations.[9]

- Access management planning will likely reduce the density of roads in the Spine area from the density that might otherwise occur, thereby potentially reducing the amount of mineral bearing land that is easily accessible for geological exploration.

[7] Coal production for B.C. is from the B.C. Ministry of Energy and Mines.
[8] Source: Based on a survey undertaken by Maki and Sunderman for BC Stats; as mentioned in the *Socio-Economic Base Case for the Southern Rocky Mountain Management Plan (SRMMP)*, 2002.
[9] *Recovery Plan for Grizzly Bears in the North Cascades of B.C.*, Page 13 of 2003 draft.

2.2 Energy

The B.C. Ministry of Energy and Mines estimates the coalbed methane potential of the Tulameen and Princeton coalfields at 122 billion cubic feet (Bcf), or approximately 0.1% of the total coalbed methane potential in B.C. (42 Bcf for the Tulameen coalfield and 80 Bcf for the Princeton coalfield). [10]

The North Cascades has several transmission corridors and pipelines that traverse the area, including a gas pipeline and an oil pipeline that follows the Coquihalla Highway.

The North Cascades is the site of two of the 16 green power generation projects approved by B.C. Hydro as part of its 2002/2003 Green Power Generation procurement process. Both are proposed by Princeton Energy Inc. from Hope, one on Berkey Creek (1.5 megawatts of capacity) and one on Hunter Creek (2.4 megawatts of capacity)[11].

B.C. Hydro and Canadian Cartographics Ltd. recently prepared a map that shows the areas in B.C. with the most potential for small hydropower development. All of the area covered by the Recovery Plan offers medium and high potential.

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **ENERGY RESOURCES**:

- The Tulameen and Princeton coalfields are already fairly accessible by roads and should not be significantly affected by the Recovery Plan should there be interest in the coalbed methane resources or coal deposits.
- No information was readily available on potential impacts of the Recovery Plan on future small hydro projects in the North Cascades Recovery Plan area.

2.3 Forestry

2.3.1 Description of the Forestry Sector in the Recovery Plan Area

The crown timber harvesting land base (THLB) in the Recovery Plan area includes portions of four BC Ministry of Forests timber supply areas, and supports annual timber harvests of approximately 1.2 million m3 and associated direct economic activity. Approximately 58% (721,049 m3) of this harvest is expected to come from forest lands within the Spine area of the Recovery Plan, which is the primary focus of grizzly bear habitat preservation and enhancement measures outlined in the Recovery Plan.

[10] Source: B.C. Ministry of Energy and Mines, *Fact Sheet: B.C. Coalbed Methane Resources* (www.gov.bc.ca/em/popt/factsheet_coalbed_methane.htm) and from *Map of Coalfields and Coalbed Methane Potential in B.C.* also on the MEM website.
[11] Source: B.C. Hydro.

Table 1 Potential Annual Timber Harvests and Related Economic Impacts*

	Merritt TSA (March 2001)	Fraser TSA (June 1998)	Lillooet TSA (Jan. 2001)	Okanagan TSA (July 2000)	Total (TSR 2)
Entire TSA					
Total Land Area (HA)	1,130,064	1,107,060	1,125,187	2,246,713	5,609,024
THLB (HA)	660,326	281,480	296,311	1,057,755	2,295,872
AAC (m3)	1,508,050	1,270,000	635,900	2,655,000	6,068,950
Direct Employment per 000m3	0.89	1.26	1.35	1.25	1.17
Total Direct Employment	1,342	1,600	858	3,319	7,120
Government Revenues per 000m3	$21,275	$16,653	$10,563	$22,868	$19,882
Total Government Revenues	$32,083,764	$21,149,310	$6,717,012	$60,714,540	$120,664,625
Recovery Plan Landscape Units					
Recovery Plan Land Area (ha)	391,390	454,510	35,760	99,090	980,750
Recovery Plan THLB (ha)	260,779	132,593	12,505	10,589	416,466
Recovery Plan AAC (m3)	595,566	598,242	26,836	26,579	1,247,223
Direct Employment per 000m3	0.89	1.26	1.35	1.25	1.09
Total Direct Employment	530	754	36	33	1353
Government Revenues per 000m3	$21,275	$16,653	$10,563	$22,868	$18,861
Total Government Revenues	$12,670,668	$9,962,521	$283,473	$607,803	$23,524,465
Spine Landscape Units					
Spine Land Area (ha)	297,540	291,620	35,760	0	624,920
Spine THLB (ha)	181,409	62,039	12,505	0	255,953
Spine AAC (m3)	414,301	279,912	26,836	0	721,049
Direct Employment per 000m3	0.89	1.26	1.35	1.25	1.05
Total Direct Employment	369	353	36	0	758
Government Revenues per 000m3	$21,275	$16,653	$10,563	$22,868	$19,082
Total Government Revenues	$8,814,258	$4,661,369	$283,473	$0	$13,759,099
Core Areas Within Spine Landscape Units					
"Core Area" in Spine L.U.s (ha)	141,870	199,710	20,730	0	362,310
"Core Area" THLB (ha)	72,304	42,486	7,249	0	122,039
"Core Area" AAC (m3)	165,128	191,692	15,557	0	372,376
Direct Employment per 000m3	0.89	1.26	1.35	1.25	1.10
Total Direct Employment	147	242	21	0	409
Government Revenues per 000m3	$21,275	$16,653	$10,563	$22,868	$18,448
Total Government Revenues	$3,513,090	$3,192,243	$164,329	$0	$6,869,662

* AAC in both the Merritt and Fraser TSAs is currently above the Long Term Harvest Levels projected in TSR2 of 1.12 million m3 per annum for the Merritt TSA and 1.2 million m3 per annum for the Fraser TSA.

Source: Based on BC Ministry of Forests (MoF) and other data including the most recent Timber Supply Reviews (TSR 2), Innovative Forest Management Studies, and North Cascades GBMP Habitat Suitability Studies.

The net economic value (economic rent) from forest sector activity in the Recovery Spine area is estimated at $15.7 million. This includes $13.8 million in government revenues (public sector rent) and $1.9 million in labour rent. This does not include any allowance for industry rents, but these are considered minimal. Appendix 3 provides more detail on the net economic value estimates.

Management of timber harvesting in the Recovery Plan area has altered substantially over the past decade, directed by provisions of the Forest Practices Code (1995 and subsequent amendments), various forest certification initiatives, and the 2001 Okanagan – Shuswap Land and Resource Management Plan in the southeast portion of the Recovery Plan area. There are also major upcoming changes to tenure regulations and timber pricing mechanisms for crown

forests[12] that coupled with changing market conditions could prompt wide scale industry restructuring.

Most of the timber harvesting land base in the North Cascades Recovery Plan area is within the Merritt TSA and Fraser TSA boundaries. In both TSAs, the current AAC is above the Long Term Harvest Level projected in the TSR2 analyses, as harvesting transitions from mature natural stands to second growth managed forests. The Fraser TSA is farther along in this transition than the Merritt TSA.

2.3.2 North Cascades Recovery Plan Initiatives with Forestry Implications

The North Cascades Recovery Plan comprises two main types of management direction: grizzly bear habitat enhancement, and grizzly bear population augmentation. The population augmentation initiatives are not likely to have an impact on timber harvesting activities, but the habitat initiatives do have some implications for timber harvest planning and operations.

The habitat initiatives that are to be applied in the central "Spine" portion of the Recovery Plan area include evaluating the **capability** of landscapes to contribute to grizzly bear habitat, and then implementing measures to preserve or enhance the **suitability** and **efficiency** of those landscapes to support the North Cascades Grizzly Bear Population Unit (GBPU).

The following table outlines habitat initiatives proposed by the Recovery Plan that have potential implications for timber harvesting and silviculture management. Some of these initiatives have implications for 'stand level' management, while others are applied more broadly to 'landscape level' management.

Stand Level Initiatives	**Landscape Level Initiatives**
Habitat Suitability Measures 1. Do not convert non-productive sites to productive through silviculture. 2. Try to incorporate important grizzly habitats in Wildlife Tree Patches and OGMAs. 3. Manage coarse woody debris to retain larger pieces within limits of current provincial policy. **Habitat Effectiveness Measures** 1. Avoid road construction within 50 meters of important grizzly habitat. 2. If roads are constructed in important grizzly habitat minimize impacts by: deactivating, restricting access, constructing temporary roads, minimizing right-of-way width, managing roadside vegetation to promote visual screening, and avoiding road use during seasons of grizzly use.	**Habitat Suitability Measures** 1. Develop grizzly bear guidelines for stocking standards in the Cascades Forest District to increase forage supply. 2. Where forage supply is a concern establish foraging WHAs under the FPC. 3. Manage foraging sites to: minimize stocking levels, employ designated skid trails, use over snow harvesting and/or cable harvesting, avoid broadcast soil disruption or herbicide application. 4. Manage for greater "openness" in forested areas with moderate to high grizzly habitat capability. **Habitat Effectiveness Measures** 1. Manage for no net loss of Core Area grizzly habitat from 1999 levels.

[12] BC Ministry of Forests, *B.C. Heartlands Economic Strategy - The Forestry Revitalization Plan*, Victoria, March 2003.

3. Design cutblocks so that distance to cover is less than 200 meters. 4. Establish security Wildlife Habitat Areas for grizzly bears under the FPC.	2. Manage for no increase in High Open Road Density areas from 1999 levels. 3. Implement Access Management Plans.

2.3.3 Potential Timber Supply Impacts

The Spine Area covers large portions of the Merritt and Fraser TSAs, and includes a small portion of the Lillooet TSA.

No comprehensive technical assessment has been undertaken to evaluate the impacts of Recovery Plan initiatives on timber supply. An analysis for the Merritt TSA[13] of an early draft of the Recovery Plan indicated that it was likely possible to implement the Recovery Plan without affecting short term or long term timber supply. The analysis suggested that Spine area provisions for maintaining 'Core Area' and for enhancing forage production were potentially constraining to the timber harvest, and would need to be carefully implemented to achieve no impact on timber supply.

In his rationale document for the Merritt TSA timber supply review in 2001, the Chief Forester commented on the potential impacts of the draft Recovery Plan as follows: "At this time, available information suggests that these guidelines should have no impact on the size of the timber harvesting land base, and no significant effects on access to timber within the timber harvesting land base."[14]

MoF staff in the Chilliwack Forest District[15] indicated that no timber supply volume impacts in the Fraser TSA are anticipated from the Recovery Plan, over and above those already considered in the implementation of the BC Forest Practices Code.

2.3.4 Potential Harvesting Cost Impacts

Many of the initiatives in the Recovery Plan will likely require alterations to timber harvesting plans and harvesting operations in the 'Spine Area' (although much of the timber harvesting is already being managed for grizzly bear habitat values through collaborative government and licensee initiatives such as the 1999 Guiding Principles for Grizzly Bear Habitat Protection for Forest Development Plans and Silviculture Prescription Planning in the Merritt TSA).

An analysis of the potential harvesting cost implications of the Recovery Plan, undertaken for the Merritt Forest District, concluded that access management initiatives in the Recovery Plan could result in additional harvesting costs of about $0.42 per m3 in affected areas. When applied to the volumes of timber expected to be harvested from 'Core Areas' within the 'Spine' in the Merritt

[13] B.C. Ministry of Forests Vancouver Forest Region (by Craig Robinson) Timber Supply Forester), *North Cascades Grizzly Bear Recovery Plan Technical Assessment of Timber Supply Impacts*, 2000.
[14] Larry Pedersen, Chief Forester, BC Ministry of Forests, *Merritt Timber Supply Area, Rationale for Allowable Annual Cut Determination*, Effective January 1, 2002.
[15] Telephone conversations with Gene MacInnes, Operations Manager, Chilliwack Forest District.

TSA (159,209 m3 per year[16]), this results in an increased cost of $66,073 per annum. Under then existing appraisal practices this cost would be largely (60%) recognized by the appraisal system, with the balance being directly borne by licensees. The analysis noted many uncertainties inherent in the assessment and calculations, and noted that the results should be considered as very approximate.

If the access management cost calculation can be applied to portions of the Spine outside of the Merritt TSA, then the total cost for the entire Spine area would be $156,000 per annum (372,376 m3 x $0.42), or about 1% of the $14 million in annual government revenues derived from Spine area timber harvesting.

In addition to access management provisions, other initiatives in the Recovery Plan will likely have some modest harvesting cost implications. The above noted Merritt TSA analysis listed the following additional cost influences, without attempting to quantify them:

- Increased staff time and office resources to schedule harvesting, manage access, plan and layout roads, participate in meetings, manage for important habitats, etc.;
- Shifts in operating areas in response to additional constraints imposed by the Recovery Plan;
- More winter harvesting with additional snowplowing or operating in deeper snowpacks; and
- Increased silviculture costs due to access limitations.

Also noted in the analysis is the potential for mitigating some of these costs through increasing cutblock sizes, relaxing green-up requirements, using a two pass harvesting system, constructing temporary roads, and using temporary bridges.

A very general, and not easily measured, positive impact on the forest industry may result from implementation of the Recovery Plan. Increased public confidence that non-timber values are being considered and nurtured in the management of crown forest lands may alleviate some of the local and international environmental concerns associated with timber harvesting activities. The grizzly bear is highly symbolic of wilderness forest land, and the presence of a healthy grizzly bear population is an indication, for many, of the existence and preservation of many other wilderness values.

The following table provides a subjective description of the impacts of Recovery Plan initiatives on timber harvesting volumes and costs.

[16] This number was calculated using the AAC for the Merritt TSA in 2000. The equivalent number (Spine, Core Area AAC contribution) calculated and shown in Table 1 (165,128 m3) uses an updated (2001) Merritt AAC.

Table 2 Timber Volume & Harvesting Cost Impacts of Recovery Plan Initiatives

Management Initiatives	Likely Volume (AAC) Impact	Likely Cost Impact	Source of Initiative	
			FPC	Recovery Plan
Stand Level Initiatives				
Do not convert non-productive sites to productive through silviculture.	None	None		X
Try to incorporate important grizzly habitats in Wildlife Tree Patches and OGMAs.	None	None	X	X
Manage coarse woody debris to retain larger pieces within limits of current provincial policy.	None	None	X	X
Avoid road construction within 50 meters of important grizzly habitat.	None	Minor		X
If roads are constructed in important grizzly habitat minimize impacts by: deactivating, restricting access, constructing temporary roads, minimizing right-of-way width, managing roadside vegetation to promote visual screening, and avoiding road use during seasons of grizzly use.	None	Minor		X
Design cutblocks so that distance to cover is less than 200 meters.	None	Minor		X
Establish security Wildlife Habitat Areas for grizzly bears under the FPC.	Minor	None	X	X
Landscape Level Initiatives				
Develop grizzly bear guidelines for stocking standards in the Cascades Forest District to increase forage supply.	Minor	None		X
Where forage supply is a concern establish foraging WHAs under the FPC.	Minor	None	X	X
Manage foraging sites to: minimize stocking levels, employ designated skid trails, use over snow harvesting and/or cable harvesting, avoid broadcast soil disruption or herbicide application.	None	Minor		X
Manage for greater "openness" in forested areas with moderate to high grizzly habitat capability.	None	None		X
Manage for no net loss of Core Area grizzly habitat from 1999 levels.	Minor	Minor		X
Manage for no increase in High Open Road Density areas from 1999 levels.	None	Minor		X
Implement Access Management Plans.	None	Minor		X

Notes:

1. A minor volume impact is defined as one that would not likely cause the Chief Forester to alter his Allowable Annual Cut determination.
2. A minor cost impact is defined as one that is likely to amount to less than $1 per cubic meter of timber harvested.

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **FORESTRY**:

- Harvest volume impact in the Spine area should be very limited if the Recovery Plan is carefully implemented, and most of that limited impact is already budgeted for under Forest Practices Code implementation in the most recent TSA timber supply analyses.
- There are likely to be some minor harvesting and silviculture cost increases in the order of 1% or 2% of the stumpage revenue generated by timber harvesting activity in the Spine Area ($150,000 to $300,000 per annum).
- There may be some increase in local and international public confidence that timber harvesting on crown forest lands can proceed while nurturing a grizzly bear population unit.

2.4 Transportation

There are three major highways running through the Recovery Plan area: the TransCanada Highway (#1) along the Fraser Canyon; the Hope-Princeton Highway (#3); and the Coquihalla Highway (#5). Over 20,000 vehicles travel through the North Cascades on a daily basis during the summer months. This includes approximately 5,000 vehicles on Highway 1, almost 6,000 vehicles on Highway 3, and some 14,000 vehicles on Highway 5.

Traffic through the North Cascades has remained relatively stable since 1991. There was a traffic shift from the Hope-Princeton Highway to the Coquihalla Highway in 1991 as a result of the completion of the Okanagan connector (Highway 97) between Merritt and Peachland in 1990. Appendix 4 provides more on traffic patterns through the North Cascades.

The Recovery Plan is not expected to have any significant impact on traffic patterns through the North Cascades. Some modest traffic calming or traffic advisory initiatives may be considered in certain areas to support Recovery Plan objectives.

2.5 Agriculture

2.5.1 Description of the Agriculture Sector in the Recovery Plan Area

Cattle ranching is the most common form of agriculture in the Recovery Plan Area, and access to crown lands for grazing is crucial to the viability of these operations. There are an estimated 47,452 Animal Unit Months (AUMs)[17] of crown land grazing in the Recovery Plan area, or approximately 5.3% of all AUMs in B.C. Crown tenures are held primarily to support livestock cow/calf operations, and there are no major sheep grazing operations in the Recovery Plan area.

The 47,452 AUMs are shared among approximately 30 tenure agreements. Some tenure agreements have less than 50 AUMs while others have several thousand AUMs. The largest tenure holders in the Recovery Plan area include the Coquihalla Development Corporation

[17] Animal Unit Month (AUM) – Unit for measuring forage or grazing capability of Crown range land; represents the amount of forage consumed in one month by a 454 kg (1000 pound) cow, either dry or with calf up to six months of age. (Source: B.C. Ministry of Forests, *1994 Forest, Range & Recreation Resource Analysis*, Appendix C-1).

(Nicola Ranch), the Quilchena Cattle Co. Ltd. and the Copper Creek Ranch, which together hold some 30,000 AUMs. There are two range tenures that are currently vacant, and they are outside the Spine area, in the southeastern portion of the North Cascades (Smith-Willis and Ashnola sub-units).

Within the Recovery Plan area, the range tenures cover most of the sub-units within the Merritt TSA (Similkameen, Tulameen, Coldwater, Otter and Spius) and the Okanagan TSA (Smith-Willis and Ashnola). There are small range tenures in Siska sub-unit in the Lillooet TSA, and no range tenures in the North Cascades portion of the Fraser TSA. Approximately 81% of the AUMs in the Recovery Plan area are in the Spine area, and 19% are outside the Spine area.[18] Appendix 5 provides more detail on AUMs of crown land grazing in the Recovery Plan area by sub-unit.

In B.C., the beef cattle industry generates an estimated $225 million in production value and full time and seasonal employment for 7,500 people. Farm labour typically includes the owner operators with seasonal workers during peak periods of stock handling and crop harvesting, and data on full time equivalent positions are not available. Range fees paid to governments add to $2.20 per AUM.

Assuming that the North Cascades accounts for approximately 5% of the beef cattle industry, the annual production value of the Recovery Plan area beef cattle industry is estimated at $12 million, employment at 397 persons, range fees at $105,802 and net economic value at $700,935. Of this, 81% is from the Spine Recovery Plan area (net economic value of $568,000). Appendix 5 provides more detail.

Other agriculture activities in the area include vegetable and fruit growing operations, ginseng farms and hay operations, but these are mainly on private lands that tend to be on the eastern boundary of the North Cascades.

2.5.2 Impact of the Grizzly Bear Recovery Plan on Agriculture

The Recovery Plan notes that ranchers have reported bear predation or injury to cattle in the Recovery Plan area, but that these events have been linked to black bears and not grizzly bears.[19] The plan also notes that on average, there are approximately 300 complaints arising from grizzly bears each year in B.C., or approximately 2.2 complaints per 100 grizzly bears based on a population estimate of 13,800 grizzly bears[20]. There are approximately 45 grizzly bears killed each year as a result of bear/human conflicts in all of B.C.[21] Data are not readily available on the number of complaints that arise as a result of livestock related incidents.

The B.C. Wild Predator Loss Control and Compensation Program (WPLCCP) helps compensate farmers and ranchers for the loss of livestock to wildlife. The program is funded through the Agriculture Environment Partnership Initiative (AEPI), a joint initiative between Agriculture and Agri-Food Canada and the B.C. Ministry of Agriculture, Food and Fisheries. The funding allocation target is $1 million per year for mitigation and prevention, and $1 million for compensation resulting from unavoidable wildlife incidents, of which grizzly bear attacks on

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[18] For the most part, the range tenures in the Otter sub-unit overlap those of the Coldwater sub-unit, and as a result, they are included as part of the Spine Area.

[19] *Recovery Plan for Grizzly Bears in the North Cascades of British Columbia*, Sept. 1, 2003 draft, page 50.

[20] Ibid, page 33.

[21] Based on B.C. Wildlife Branch data between 1992 and 1998, as reported in Bears in B.C. website (bears inbc.com).

livestock would be only one component (other predators would include black bear, elk, wolf and deer).[22]

The WPLCCP has been in place since August 2002, and they have handled approximately 80 claims for a total value of $60,000, although this is estimated to represent between 5% and 8% of total predator losses from wildlife.[23] The areas with the most claims include the Cariboo Chilcotin, Prince George and Peace regions, with none of the claims being in the North Cascades. Claims mainly relate to wolf and black bear incidents, although grizzly bear incidents are also relatively common. By comparison, between 1974 and 1993, the Alberta Livestock Predator Compensation Program (LPCP) paid out approximately $25,000 per year on bear related livestock losses mainly for calves killed by mature and old black bears.[24]

Incidents related to grizzly bears in B.C. might be assumed to cost some $100,000 per year (this assumes that 10% of all livestock incidents in B.C. relate to grizzly bears, and that all livestock losses add to approximately $1 million per year, based on between 5% and 8% of incidents being reported). Once the North Cascades grizzly bear population has recovered to 150 grizzly bears, one might expect livestock losses related to additional grizzly bears in the North Cascades to range between $1,000 per year (based on the North Cascades having 150 grizzly bears or 1.1% of the grizzly bear population) and $5,000 per year (based on the North Cascades supporting 5% of the province's AUMs).

The Recovery Plan indicates that "crown range cattle grazing tenures including alpine areas and cattle damage to riparian areas may be in conflict with grizzly bear management objectives in a few areas."[25] Any reduction in crown range cattle grazing tenures will likely have a proportional negative impact on the local ranching operations.

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **AGRICULTURE/ RANCHING OPERATORS**:

- The slow increase in the number of grizzly bears to 150 as proposed in the Recovery Plan may result in relatively minor additional livestock losses once the population has recovered (estimated to average between $1,000 and $5,000 per year). Various government and industry-funded programs help compensate ranchers and farmers against predator losses.
- The North Cascades accounts for 5% of the ranching activity in the province generating approximately $700,000 in net economic value. There are an estimated 47,452 AUMs in the North Cascades of which approximately 81% is in the Spine area. Any infringement on crown range grazing tenures to accommodate grizzly bear habitat will proportionately reduce cattle ranching potential in the Spine area.

[22] The funding targets were established based on the initial priorities and the expenditures experienced in the first year of operation. Source: B.C. Agriculture Council, *Agriculture Environment Funds Strategic Plan*, Agriculture and Agri-Food Canada and B.C. Ministry of Agriculture, Food and Fisheries, 2003, page 9).
[23] Source: discussions with program representative, October 2003.
[24] Source: Government of Alberta, Sustainable Resource Development, *Bear Problems and Management*, www3.gov.ab.ca/srd/fw/bears/present.html.
[25] *Recovery Plan for Grizzly Bears in the North Cascades of B.C.* , 2003, page, page 50.

3 Assessment of Recovery Plan Impacts on Recreation and Tourism

The North Cascades is a major destination for front country and back country recreation. While the region has a very small population base, it is within a few hours drive of the Lower Mainland and the Okanagan Valley, the two most densely populated areas of B.C. Some 2 million people reside in the Lower Mainland and approximately 450,000 people reside in the Okanagan Valley.[26]

Some of the recreation activities that occur in the North Cascades are as follows.

Spring/Summer/Fall	Winter/Spring
• Angling	• Dog Sledding
• ATVs, motorbikes	• Downhill Skiing and Snowboarding
• Botanical forest products/ wood gathering	• Nordic Skiing
• Canoeing, kayaking	• Ski-touring
• Hiking, wildlife viewing, photography	• Snowmobiling
• Horseback trail riding	
• Hunting	
• Mountain biking	
• River rafting	

This section provides an overview of recreation and tourism activities in the North Cascades and assesses the socio-economic impacts of the North Cascades Recovery Plan on these activities.

3.1 Recreation in the Recovery Plan Area

3.1.1 Parks and Recreation Areas

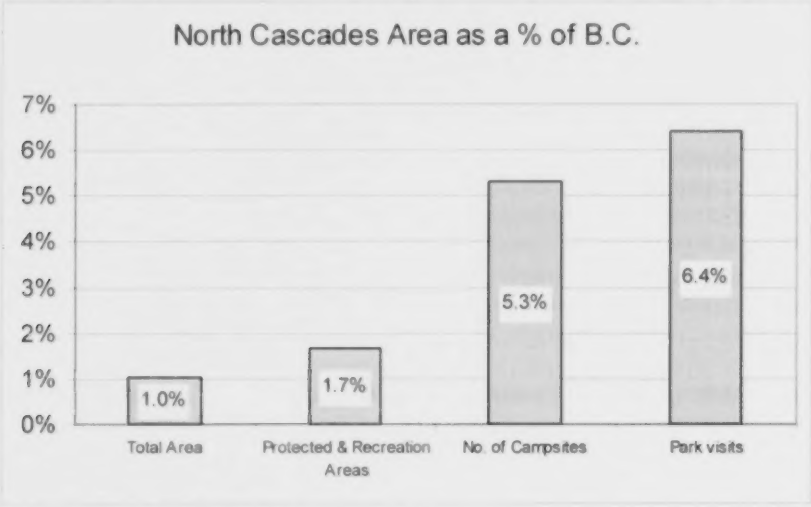
The Recovery Plan area includes some 9,800 km^2 of which approximately 20% is in provincial parks, recreation areas and protected areas. Most of the balance of the area is essentially crown lands and provincial forests which have been managed, for recreation, by the Ministry of Forests.[27]

Major Provincial Parks in the North Cascade GBPU include Manning, Cathedral, Skagit Valley, and Chilliwack Lake. Major areas which are designated as Recreation Areas or Protected Areas include the Cascade Recreation Area and the Snowy Protected Area. For the year 2000, visits to parks, protected areas and recreation areas in the North Cascades added to an estimated 1.5 million visits (excluding park visits to the Coquihalla Summit Recreation Area). While parks and recreation areas in the North Cascades account for approximately 1.7% of all parks and recreation areas in B.C., they account for 6.4% of all park visits in B.C., reflecting the close proximity to the Lower Mainland and Okanagan population base, as well as the greater number of camping facilities.
Parks and recreation areas offer a wide range of accommodation including:

[26] *Recovery Plan for Grizzly Bears in the North Cascades of B.C.* , 2001, page 37.
[27] In 1993/1994, the B.C. Ministry of Forests reported being responsible for managing outdoor recreation on about 85% of the province, or most of the crown land outside parks (Source: B.C. Ministry of Forests, *1994 Forest, Range & Recreation Resource Analysis*, 1994). In 2003, the B.C. Government set a new recreation policy that aims to arrange contracts with park facility operators to help manage the park resources. (Source: B.C. Ministry of Water, Land and Air Protection, *New Model Promotes Recreation, Conservation*, 2003).

- Some 700 camping sites with road access;
- Another 200 backcountry sites without road access;
- The Manning Park Resort, a 73 room resort with a central lodge and surrounding cabins;
- Cathedral Lakes Resort, a 21 room resort located 16 km from the Cathedral Park boundary and only accessible by the resort jeep service; and
- Various wilderness backcountry cabins.

Chart 3 Recreation Activities in the Recovery Plan Area as a Percentage of B.C.



Source: BC Parks data. Appendix 6 provides more detail.

The Provincial Parks and Recreation Areas in the Recovery Plan area generate 583 Full-Time-Equivalent (FTE) positions through direct, indirect and induced employment from park operations and related visitor spending (based on B.C. data and the % of visits to the North Cascades).

The net economic value from the 146,957 camping visits to Provincial Parks in the Recovery Plan area is estimated at $5 million per year (2000 data). Estimates of net economic value from the 1.36 million day use visits are not available. Appendix 6 provides more detail on the economic impacts from park operations.

3.1.2 Recreation in Provincial Forests and Other Crown Lands

BC Parks estimates that for all of B.C., recreational visits in provincial forests exceed the number of recreational visits to parks and recreation areas (see Appendix 6). For the Recovery Plan area, recreational visits to provincial forests and other crown lands are estimated to be at least as frequent as the 1.5 million visits to Provincial Parks and Recreation Areas in the North Cascades:

- Provincial forests offer the same non-motorized activities that are offered in parks and recreation areas, but they also offer backcountry motorized activities and activities such as horseback riding and hunting, which are not always and often not at all, permitted in Provincial parks and Recreation Areas.

- Provincial forests offer an extensive network of trails. In the North Cascades, major trails include a portion of the Trans Canada Trail (TCT)/ Kettle Valley Railway line.

- The three highways that cross the North Cascades render much of the provincial forests as accessible as the parks in the area.

In the North Cascades, recreation in provincial forests likely generates similar visitation rates, and therefore might be expected to generate similar socio-economic impacts as the Provincial Parks and Recreation Areas. The following paragraphs provide an overview of wildlife viewing, as well as three other activities that occur primarily in provincial forests, namely hunting, angling and snowmobiling. Appendix 6 provides more detail on each of these activities.

3.1.3 Selected Recreation Activities

Wildlife Viewing

No direct measures of the extent of wildlife viewing activity in the Recovery Plan area are available. A 1996 study on the economic value of wildlife viewing activity in B.C. suggests that as much as $621 million was spent on wildlife viewing activities including transportation, accommodation, food, etc. in 1996.[28] Expenditures are only one measure of the economic impact of wildlife viewing activities. The estimated net economic value based on willingness to pay is even larger at almost $1 billion.

Even if the North Cascades accounts for only a small percentage of the above estimates, the net economic value of wildlife viewing activities in the North Cascades would still be considerable.

Resident Hunting

The proximity of the North Cascades to the Lower Mainland and Okanagan populations make it a convenient hunting area for B.C. residents, accounting for an annual average between 1990 and 2002 of 27,245 hunter days. The B.C. Ministry of Water, Land and Air Protection (MWLAP) estimates the net economic value associated with resident hunting in the North Cascades at $1.4 million per year. [29]

Resident Angling

There is very little information on the economic and social significance of resident angling activities in the North Cascades area. In the Thompson Nicola/ Kamloops region, the most popular area for angling is outside the Recovery Plan area and generally includes the area east of Tulameen, Coldwater River and the North Cascades area. There are nevertheless some popular small fishing lakes in the North Cascades. Fishing in streams and rivers is also popular in southwest B.C. notably on the Fraser River, the Thompson River and many of the rivers and creeks in the North Cascades area.

Snowmobiling

Snowmobiling is a popular winter recreation activity in the North Cascades provincial forests, as well as in the Granite Mountain area in the north east part of the Cascade Recreation Area.

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[28] Source: Roger Reid, *Economic Value of Wildlife Activities in B.C.*, 1996, Tables 18,19, 20, 28 and 29.
[29] Source: B.C. Ministry of Water, Land and Air Protection (MWLAP), Wildlife Branch, tables provided for each management unit in the Recovery Plan area. In preparing this estimate, MWLAP uses a contingent valuation method in conjunction with a survey of actual expenditures to determine the net economic value or consumer surplus associated with resident hunting activities.

Snowmobiling is not permitted in any of the Provincial Parks. Snowmobiling clubs that are active in the area include the Cheam Whiskey Jacks Snowmobiling Club based in Chilliwack, and clubs in Merritt, Princeton and Keremeos (Similkameen Snowmobile Club).

Estimates of expenditures by snowmobile tourists range between $85 and $225 per day.[30] Data on the number of snowmobiling days for the North Cascades are not available.

3.2 Backcountry Tourism in the Recovery Plan Area

The North Cascades area supports a diverse tourism sector, from front-country lodges, resorts and activities to a variety of backcountry wilderness-related products, that stand to be affected by the Recovery Plan. The front-country and backcountry tourism operations are to some degree dependent on each other. Tourists use front-country accommodations as a base from which to access the backcountry, and tourists attracted to front-country operations may become aware of, and patronize, backcountry tourism operations.

Front country tourism in the North Cascades includes the Manning Park Resort and associated skiing operations, Coquihalla Lakes Lodge and various lodges, cabins and other accommodations with road access.

Backcountry tourism in the North Cascades includes two main product types: Adventure Travel/ Adventure Lodges and Hunting/Guide-Outfitting. Fishing oriented resorts and guided angling are common east of the North Cascades Recovery Plan area, but not inside the Recovery Plan boundaries.

There may be as many as 15 backcountry tourism operators in and around the Recovery Plan area, including 12 operators that offer a variety of river rafting, horseback riding and adventure tours and 3 hunting guide outfitters (based on a review of internet searches). In addition, Cathedral Lakes Resort is a backcountry lodge in Cathedral Provincial Park, which is approximately 16 km from the park boundary and can only be reached by the resort jeep, or by foot. The socio-economic contribution of those operators is detailed following and in Appendix 7.

3.2.1 Wilderness/ Adventure Lodges and Accommodation

The Manning Park Resort operations and activities primarily consist of year-round front country tourism even though some activities take place in a wilderness setting, such as cross country skiing or hiking. The Manning Park Resort, Cathedral Lakes Resort and other adventure lodges in the North Cascades such as Coquihalla Lakes Lodge are important contributors to the regional economy.

The Provincial Parks and recreation areas in the North Cascades generate an estimated 583 direct, indirect and induced FTEs of employment from park operations and park visitor spending on food, accommodation and other services. In the North Cascades, recreation in provincial forests likely generates similar visitation rates and impacts as the Provincial Parks and Recreation Areas.

[30] City of Revelstoke, *Revelstoke Snowmobile Strategy*, 2002.

3.2.2 Guide-Outfitting

In B.C., out-of-province hunters are required to use the services of guide outfitters. The B.C. Ministry of Water, Land and Air Protection (MWLAP) data show that from 1990 to 2002, average annual non-resident hunting effort for the Recovery Plan area accounted for 201 hunter days (0.4% of total for B.C.) and 47 hunters (1% of total for B.C.). The net economic value from guide outfitting is estimated at approximately $53,000 per annum. (Appendix 7 provides details of the estimates).

3.2.3 Adventure Travel Commercial Operators

There may be as many as 12 adventure travel commercial operators that operate in the North Cascades. This assumes 4 river rafting operators that operate some of their tours on the Fraser River and Chilliwack River; 4 guest ranches; 2 operators offering winter tours; and 2 other operators that offer tours that focus on other activities.

The river rafting tour companies that operate on the Fraser River and the Chilliwack River are some of the largest river rafting tour companies in the Province. These companies also offer tours on many other B.C. rivers, and only a portion of their revenues would result from tours in the North Cascades. Moreover, a larger portion of their revenues from the Fraser River and Chilliwack River are from day tours rather than multi-day tours that rely more heavily on wilderness camping sites. The river rafting operators generate an estimated $500,000 in gross revenues from river rafting on the Fraser River and yield an estimated $35,250 in net economic value to the province.

In addition to river rafting, the land based adventure travel operators may generate as much as $700,000 in gross revenues and an estimated $51,750 in net economic value to the province (Appendix 7 provides more detail).

3.3 Assessment of Recovery Plan Impacts on Recreation and Tourism

The following table summarizes the influences of the Recovery Plan on recreation and tourism for each major activity. The table indicates aspects of the Recovery Plan strategies that may stimulate or frustrate each activity, and then presents a judgement on whether the net impacts on commercial operators and recreationist/adventure tourists are positive or negative.

Table 3 Recovery Plan Impacts on Backcountry Recreation and Tourism

	Stimulate Activities	Frustrate Activities	Net Impact on:	
			Commercial Operators/ Tourism	Recreation
Lodges and Cabins	Bear aware program may help reduce black bear conflicts; may present a marketing opportunity to reinforce bear country theme; perceived greater chance of sighting a grizzly bear may appeal to clients	May be some minor cost and inconvenience associated with bear proofing initiatives; anxiety over perceived greater chance of grizzly bear encounter may deter some potential clients	Neutral	Neutral

	Stimulate Activities	Frustrate Activities	Net Impact on:	
			Commercial Operators/ Tourism	Recreation
Camping at Recreation Sites	Bear aware programs may reduce problems with black bears at camping sites	May be some minor cost and inconvenience associated with bear proofing initiatives; access management may limit future site development or expansion	Neutral	Neutral
Ski Touring Popular destination for ski-touring	No impact in winter	No impact in winter	Neutral	Neutral
Heli-Skiing/ Cat-Skiing	There are no heli-skiing or cat skiing operations in the North Cascades	Access management plans are not yet initiated, although the Recovery Plan does mention the need to limit helicopter operations; potential for heli-skiing and cat skiing is very limited in the North Cascades	Not applicable	Not applicable
Snowmobiling		No impact in winter; may be some minor impact in spring as habitat concerns may result in some small areas being closed to snowmobiles Access management may preclude access to some areas with snowmobiling potential	Minimal to no impact on existing - for potential	Minimal to no impact on existing - for potential
ATVs, Motorbikes used in conjunction with other recreation activities such as hunting, berry picking, recreational prospecting, rock hounding, and general access to backcountry.		May be some minor impact in summer as habitat concerns may result in some small areas being closed to motorized activities; access management may reduce the overall levels of access to provincial forests from what they otherwise might be	Minimal to no impact on existing - for potential	Minimal to no impact on existing - for potential
Mountain Biking/ Hiking/ Wildlife Viewing Including Photography	Grizzly bear augmentation may increase number of sightings; bear aware program may help reduce conflicts with black bears; Access management may reduce erosion of non-motorized experience in some areas	May be some minor impact in summer as habitat concerns may result in some small areas being closed to recreation; habitat concerns may result in deactivation of some forestry roads or trails; Restrictions on helicopter use could restrict potential growth for commercial operations offering heli-biking / heli-hiking product	Minimal to no impact on existing - for potential	Minimal to no impact on existing - for potential
River Rafting, Canoeing, Kayaking	Grizzly bear augmentation may increase number of sightings; bear aware program may help reduce conflicts with black bears	May cause anxiety over a real or perceived increase in the risk of unwanted grizzly bear encounters	Neutral	Neutral
Guest Ranches/ Horseback Trail Riding	Grizzly bear augmentation may increase number of sightings; bear aware program may help reduce conflicts with black bears	May be some minor impact in summer as habitat concerns may result in some small areas being closed to recreation; May cause anxiety over a real or perceived increase in the risk of unwanted grizzly bear encounters	Minimal to no impact on existing - for potential	Minimal to no impact on existing - for potential

	Stimulate Activities	Frustrate Activities	Net Impacts
Resident and Guided Angling		Restrictions on future road development may limit opportunities in some areas, although angling potential is limited when compared to area east of North Cascades	Neutral

	Stimulate Activities	Frustrate Activities	Net Impacts
Resident and Guided Hunting		- Restrictions on road development may limit opportunities for some hunters	- for potential

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **RECREATION**:

- The Recovery Plan bear awareness program may reduce conflicts with black bears, as well as grizzly bears.
- The most important impact on recreation will likely be on future motorized recreation opportunities such as ATVs and backcountry driving, and access to parts of the Spine area that are not already heavily roaded.
- There may also be some trails that are re-routed or closed for certain key periods due to specific grizzly bears activities.

SOCIO-ECONOMIC IMPACTS OF THE RECOVERY PLAN ON **BACKCOUNTRY COMMERCIAL TOURISM OPERATORS**:

- If the grizzly bear population in the North Cascades reaches 150, this implies a grizzly bear density of 15 grizzly bears per 1000 sq km, which is much higher than the existing density of 2 grizzly bears per 1000 sq km, but is much lower than grizzly bear densities in other popular recreation and tourism areas in the Kootenays. It is therefore unlikely that the greater grizzly bear densities would lead to negative impacts on backcountry tourism in the region.
- The Recovery Plan augmentation program is unlikely to result in any significant increase in tourism activity as it is not expected that any specific area would attract a sufficiently high concentration of grizzly bears to justify grizzly bear viewing tours to that area.

4 Assessment of Recovery Plan Impacts on First Nations

The Recovery Plan lists 20 First Nations bands with interest in the Recovery Plan area. They include:

Sto:lo Nation:
- Shx'wow'hamel
- Peters
- Popkum
- Cheam
- Yakweakwioose
- Tzeachten
- Soowahlie

Fraser Canyon Indian Administration: Nicomen Band

Nicola Tribal Association:
- Cook's Ferry
- Coldwater
- Lower Nicola
- Nooaitch
- Shackan
- Siska

Independent: Yale Band

Okanagan Nation Alliance:
- Upper Similkameen
- Lower Similkameen

Nlaka'pamux Nation Tribal Council:
- Boothroyd
- Boston Bar
- Spuzzum

The Recovery Plan recognizes the long established traditional use by many First Nations bands within the Recovery Plan area. The Recovery Plan indicates the intent of the Recovery Team to consult and improve communication with First Nations, stakeholders and the general public regarding issues and concerns that may arise.

A review of the Indian Reserves in or near the Recovery Plan area shows that there are 2,658 people residing on 48 Indian Reserves, in 1,080 dwellings. Indian reserves account for 156.5 square km, or 1.6% of the Recovery Plan area land base. Appendix 8 provides more detail.

Many of the habitat protection measures intend to limit further road development and the erosion of grizzly bear habitat in the North Cascades. Limiting further road development may assist in protecting traditional First Nations values.

In the course of this assessment, no effective mechanism was established to gather information on how the Recovery Plan might impact the interests of First Nations in the area, and no assessment of those impacts is therefore attempted.

5 Assessment of Recovery Plan Impacts on Settlements

5.1 Population in and Near the Recovery Plan Area

The Recovery Plan area includes parts of the Chilliwack, Hope, Merritt, Princeton and Keremeos Local Health Areas (LHAs). Together, these LHAs have a population of approximately 37,600, excluding the municipality of Chilliwack, which is outside the North Cascades and has a population of almost 67,000 people. Excluding the municipality of Chilliwack, these 5 LHAs cover an area of 20,303 square km.

The Recovery Plan area is approximately 9,800 square km, or 48% of the five LHAs, but almost all populated regions of the Chilliwack, Hope, Merritt, Princeton and Keremeos LHAs are outside the Recovery Plan area. Moreover, communities which are part of the Recovery Plan area such as Hope, Boston Bar, Lytton, Princeton, Sunshine Valley, Coalmont and Tulameen, are either outside or just on the boundary of the Spine area.

The communities of Hope, Boston Bar, Lytton and Princeton have a combined population of approximately 9,500 permanent residents. The small communities that are closest to core grizzly habitat such as Eastgate, Othello, the Sunshine Valley, Tulameen and Coalmont, are very small, with a combined population of up to 500 permanent residents.

The population of communities in and near the North Cascades has either remained stable or declined slightly between 1996 and 2001, except for settlements near the municipality of Chilliwack where some communities have seen an increase.

5.2 Impact on Settlements and Rural Population

The Recovery Plan states that there are no documented grizzly bear conflicts associated with people or property in Merritt, Princeton or Keremeos. Also, the Recovery Plan recognizes the need to manage grizzly bear and human conflicts associated with urban centres and rural settlements.[31]

There are no major communities within the spine area of the North Cascades, except for a few communities such as Hope, Princeton and Lytton that are on the boundary of the GBPU. There are however, some 2 million people who reside in the Lower Mainland and approximately 450,000 who reside in the Okanagan Valley, just a few hours drive from the North Cascades.

Given the intended very slow build-up of grizzly bear population levels, and the modest density that is likely to be ultimately achieved, there should be no specific impact to communities from augmentation initiatives. There may be some increase in public anxiety over real or perceived increases in the risk of unwanted grizzly bear encounters.

The magnitudes of any economic impacts resulting from the Recovery Plan are expected to be too small to affect the viability or functioning of any communities.

[31] Recovery Plan for Grizzly Bears in the North Cascades, 2003 draft.

6 Summary and Conclusions

The North Cascades Grizzly Bear Recovery Plan is mandated to move the status of the grizzly bear population unit from 'threatened' to 'viable', without imposing significant new impediments to land and resource access in the North Cascades region.

There are three main types of management initiatives outlined in the Recovery Plan including habitat preservation/enhancement, population augmentation, and public education.

The public education initiatives are expected to have generally positive socio-economic implications, in helping to minimize the potential for human/bear or livestock/bear conflicts, not only for grizzly bears, but for the much larger black bear population as well. The only potential negative socio-economic consequence (other than the cost of implementation) is any unintended increase in public anxiety over the potential for grizzly bear encounters.

Population augmentation (translocation) initiatives are to be gradually phased in, with very small annual population increments once the initiatives are fully implemented. Any negative socio-economic implications of population augmentation are expected to be extremely minor until a substantial cumulative change has occurred in the population total. Even if a population of 150 bears is achieved, the population density will be at the lower end of the range of population densities in BC grizzly bear population units. There is little evidence that human/grizzly bear or livestock/grizzly bear conflict presents a major problem at these density levels.

Public perception of the risks of unwanted grizzly bear encounters will not necessarily change in proportion to the actual change in this risk level, and there may be little tolerance for any real or perceived increase in this risk level, regardless of how small it actually is. Accordingly, the population augmentation initiatives may cause some increase in public anxiety over the possibility of unwanted grizzly bear encounters.

Habitat preservation/enhancement strategies in the Recovery Plan, including as yet unspecified access management plans, have the greatest potential for negative socio-economic consequences, but these impacts are expected to be very small. For timber harvesting, there will likely be some modest harvesting and silviculture cost increases in some areas, as well as some additional constraints within which to manage timber supply. The timber supply constraints are not, on their own, expected to be significant enough to cause alteration to the allowable annual cut in any of the three timber supply areas that extend into the Recovery Plan Spine area.

Other impacts of the habitat preservation/enhancement strategies may include small reductions in the amount of Crown land available for cattle grazing, some constraint on future levels of accessibility to lands for mineral exploration, and some constraints on access to backcountry wilderness for various recreation activities. These values are very significant to the area and to the province, and implementation of the habitat strategies, including access management planning, will require care to avoid significant impacts on these values. The Recovery Plan indicates that stakeholder participation/consultation processes will be employed during plan implementation to avoid any unintended negative impacts on these and other values.

APPENDIX 1 GRIZZLY BEAR POPULATION UNIT DENSITY ESTIMATES

Grizzly Bear Population Unit	Contributing Land Area	Habitat Capability	Habitat Capability Density /1000 sq km	Habitat Effective-ness	Habitat Effective-ness Density	% Habitat Effectiveness of Habitat Capability	Total Population Estimate	Population Density /1000 sq km	% Pop. Est. of Habitat Capability	Conservation Status
KHUTZEYMATEEN	8,069	475	59	447	55	94%	376	47	79%	Viable
FLATHEAD	3,434	215	63	162	47	75%	151	44	70%	Viable
NORTH SELKIRK	6,003	276	46	271	45	98%	264	44	96%	Viable
PARSNIP	10,999	487	44	486	44	100%	473	43	97%	Viable
KINGCOME-WAKEMAN	5,442	253	46	239	44	94%	230	42	91%	Viable
NORTH PURCELL	5,470	238	44	237	43	99%	228	42	96%	Viable
UPPER SKEENA-NASS	16,999	673	40	673	40	100%	661	39	98%	Viable
QUESNEL LAKE NORTH	9,100	365	40	322	35	88%	317	35	87%	Viable
SPILLAMACHEEN	4,069	148	36	146	36	98%	141	35	95%	Viable
BABINE	14,039	510	36	499	36	98%	487	35	96%	Viable
ROBSON	20,078	716	36	706	35	99%	689	34	96%	Viable
CENTRAL ROCKIES	6,923	246	36	245	35	100%	235	34	95%	Viable
KITLOPE-FIORDLAND	10,336	370	36	365	35	99%	346	33	94%	Viable
CENTRAL PURCELL	4,619	162	35	158	34	98%	150	32	93%	Viable
NORTH COAST	6,776	269	40	250	37	93%	214	32	80%	Viable
CENTRAL SELKIRK	5,681	214	38	190	33	89%	178	31	83%	Viable
KWATNA-OWIKENO	10,650	347	33	336	32	97%	316	30	91%	Viable
CRANBERRY	11,649	405	35	376	32	93%	341	29	84%	Viable
WELLS GRAY	12,837	430	33	380	30	88%	374	29	87%	Viable
STEWART	11,342	360	32	340	30	94%	319	28	89%	Viable
ROCKIES PARK RANGES	5,850	184	31	177	30	97%	164	28	89%	Viable
VALHALLA	3,479	111	32	98	28	89%	96	28	87%	Viable
NATION	18,128	502	28	497	27	99%	484	27	96%	Viable
COLUMBIA-SHUSWAP	14,927	493	33	404	27	82%	396	27	80%	Viable
KNIGHT-BUTE	6,620	216	33	192	29	89%	173	26	80%	Viable
SPATSIZI	21,702	562	26	562	26	100%	540	25	96%	Viable
OMINECA	29,171	739	25	739	25	100%	726	25	98%	Viable
SOUTH ROCKIES	8,306	248	30	233	28	94%	201	24	81%	Viable
MOBERLY	7,577	210	28	198	26	94%	174	23	83%	Viable
SOUTH PURCELL	6,898	198	29	169	25	85%	158	23	80%	Viable
FINLAY-OSPIKA	30,302	721	24	721	24	100%	689	23	95%	Viable
CENTRAL MONASHEE	6,349	198	31	149	23	75%	143	23	72%	Viable
EDZIZA-LOWER STIKINE	17,122	396	23	388	23	98%	371	22	94%	Viable
MUSKWA	36,108	815	23	815	23	100%	774	21	95%	Viable

Grizzly Bear Population Unit	Contributing Land Area	Habitat Capability	Habitat Capability Density /1000 sq km	Habitat Effective-ness	Habitat Effective-ness Density	% Habitat Effectiveness of Habitat Capability	Total Population Estimate	Populatio n Density /1000 sq km	% Pop. Est. of Habitat Capability	Conservation Status
SOUTH SELKIRK	4,074	139	34	87	21	63%	86	21	62%	Viable
CASSIAR	36,374	759	21	758	21	100%	730	20	96%	Viable
HART	19,661	540	27	416	21	77%	386	20	71%	Viable
ROCKY	38,085	822	22	788	21	96%	730	19	89%	Viable
HYLAND	17,268	347	20	347	20	100%	326	19	94%	Viable
TATSHENSHINI	19,216	395	21	392	20	99%	360	19	91%	Viable
TAKU	32,315	650	20	642	20	99%	595	18	92%	Viable
BULKLEY-LAKES	23,521	492	21	478	20	97%	486	21	99%	Viable
FRANCOIS	8,087	160	20	148	18	92%	140	17	88%	Viable
YAHK	2,719	65	24	48	18	74%	44	16	68%	Viable
TWEEDSMUIR	18,458	323	17	306	17	95%	279	15	86%	Viable
KETTLE-GRANBY	6,585	167	25	84	13	51%	81	12	48%	Threatened
NULKI	16,796	369	22	205	12	56%	192	11	52%	Threatened
ALTA	13,256	204	15	204	15	100%	133	10	65%	Viable
TOBA-BUTE	7,606	99	13	86	11	87%	75	10	76%	Viable
SQUAMISH-LILLOOET	5,689	165	29	134	24	81%	56	10	34%	Threatened
BLACKWATER-WEST CHILCOTIN	20,630	396	19	206	10	52%	193	9	49%	Threatened
KLINAKLINI-HOMATHKO	13,643	152	11	144	11	95%	109	8	72%	Viable
STEIN-NAHATLATCH	7,710	217	28	173	22	80%	61	8	28%	Threatened
SOUTH CHILCOTIN RANGES	16,125	237	15	218	14	92%	104	6	44%	Threatened
GARIBALDI-PITT	6,463	226	35	180	28	80%	18	3	8%	Threatened
NORTH CASCADES	9,801	319	33	233	24	73%	23	2	7%	Threatened
TAIGA	50,046	128	3	123	2	96%	92	2	72%	Viable
Total	**791,182**	**20,124**	**25**	**18,568**	**23**	**92%**	**16,878**	**21**		

Note:
A map of the Grizzly Bear Population Units is available at wlapwww.gov.bc.ca/wld/grzz/gbpu_colour.jpg
Source: Ministry of Water, Land and Air Protection, December 2003.

APPENDIX 2 MINING SECTOR

The mining industry has played a key role in the development of the North Cascades area.

Princeton was first called Vermilion Forks after the rich deposit of red ochre west of the town on the Tulameen River. The town was re-named Princeton in 1860. While Princeton owes much of its existence to trapping, hunting, ranching and forestry, mining towns established nearby helped solidify the community. Mining towns near Princeton included:

- Near the end of the 19th Century, gold was discovered at Granite Creek and Granite City was established approximately 20 km northwest of Princeton, just east of Coalmont – while Granite City claimed over 2,000 residents, it became a ghost town by the year 1900.
- The community of Allenby was established in the 1920s when Granby Mining Company started mining copper on Copper Mountain.
- Blakeburn was established in 1910 around the coal mine just southwest of Granite City.

The community of Coalmont is named after a nearby mountain of coal. Coalmont was established in 1911 by Columbia Coal and Coke Ltd. and housed many employees of the Blakeburn coal mine approximately three miles away from Coalmont.

Tulameen was established as a Hudson's Bay camp as early as 1846, and was a thriving community during the Granite Creek Gold Rush.

The Barkerville Gold Rush of 1858 was a catalyst in the establishment and growth of communities all along the Fraser River including the communities of Hope, Boston Bar, Yale and Lytton.

The North Cascades is an important region of the province for the mining sector. The following table compares the North Cascades to B.C. for selected mining indicators.

Table 4 Key Mining Indicators for the North Cascades

	Recovery Plan Area (1999 data)	Recovery Plan Area as a % of B.C.	B.C.
Total Area (ha)	980,700	1.0%	94,726,166
Mineral Tenures	76,733	2.5%	3,012,263
Coal Tenures	2,801	1.6%	177,808
Placer Tenures	5,457	3.6%	150,916
Mineral Occurrences:			
Producers	3		
Developed Prospects	12		
Past Producing Mines	59		
Prospects	98		
Showings	222		
Total	394	3.3%	12,036

Exploration Expenditures	Recovery Plan Area	% of B.C.	B.C.
ARIS - Annual Average 1970-2002 (note 1)	$1,042,220	2.4%	$43,831,112
ARIS Exploration Expenditures 2002 (note 1)	$159,890	0.8%	$19,073,612
Total BC Exploration Expenditures 2002 (note 2)			$29,500,000
ARIS Expenditures as % of BC Exploration Exp.			65%

Note:

1. The tables at the end of this Appendix provide more detail on ARIS expenditures.
2. For 2002, the Ministry of Energy and Mines (MEM) reports total fieldwork and overhead mineral expenditures for B.C. at $29.5 million (based on the National Mining Exploration Survey) and total exploration expenditures at $40 million. Source: MEM, *Mineral Exploration Expenditure Time Series, 1946 to 2003*.

Source:

1. Ministry of Energy and Mines, Assessment Report Index (ARIS) database on mineral exploration expenditures, 2003.
2. Pierce Lefebvre Consulting et al., Socio-Economic Impact Assessment of the Provincial Government's Strategic Land Use Plans on Key Sectors in B.C., 2001, Appendix 4.
3. North Cascades Grizzly Bear Recovery Team, *Recovery Plan for Grizzly Bears in the North Cascades of B.C.*, 2003 draft, page 49.

The above table shows that the North Cascades includes some 394 mineral occurrences. These are primarily located along the South Eastern boundary of the North Cascades near the communities of Princeton, Tulameen and Coalmont, as well as along the Fraser River boundary near the community of Yale. There are also mineral occurrences on the edge of some of the protected areas and Provincial Parks.

Recent exploration activity in the Recovery Plan area has focused on deposits near some of the past producing mines near Tulameen, Princeton and Coalmont. This includes:

- The Red Star gold, silver, zinc and copper deposit near the Manning Park Eastgate, (in 1997/1998, Teck Corporation began a drilling program that earned it a 70% interest in Redstar Resources Corporation);[32]
- Exploration in the Coquihalla Gold Belt near the Carolin Mine (operated between 1981 and 1984) and Aurum Mine (operated between 1928 and 1942);[33]
- Gold and platinum exploration near Grasshoper Mountain near Tulameen (the Grasshopper gold mine operated between 1938 and 1941);
- Some gold and copper prospecting near the Hedley camp (MEM reports that in 1997, exploration work for that deposit totalled almost $500,000); and
- Some prospecting on the eastern side of the Recovery Plan area boundary near Treasure Mountain, as well as northwest of Tulameen near Boulder Mountain, although in both areas, major exploration projects date back to the 1980s.

Other major deposits in the Recovery Plan area include the Giant Copper prospect, which is

[32] MEM, Minfile Capsule Geology and Bibliography, Production Report for Red Star Deposit, 092HS067.
[33] MEM, Minfile Capsule Geology and Bibliography, Production Report for Ladner Creek, Production Report, 092HNW007.

located 1.5 kilometers east of the Skagit Valley Recreation boundary. The prospect is 100% owned by Bethlehem Resources Corp. a wholly owned subsidiary of Imperial Metals. The Giant Copper property straddles the northern boundary of the Skagit Valley Park, but future access to the mine has been guaranteed under the Park Act (1996).[34] MEM also reports some recent exploration projects near Miner Mountain in the Similkameen division.

Table 4 shows that between 1970 and 2002, expenditures on mineral exploration have averaged $1 million per year, although these include only reported expenditures included in the ARIS database. Exploration expenditures of $1 million translate to approximately 10 PYs of direct employment.[35]

Table 4 also shows that MEM reports 3 producing mines, compared to 59 past producers. Of those three producing mines, two are granite quarries. Employment from the 3 small operating mines and quarries are estimated at 6 PYs of direct employment[36] bringing the total direct employment impact from the mining sector at approximately 16 PYs and labour wages and salaries of some $0.8 million (based on $50,000 per PY).

The net economic value (rent) to labour may be estimated at 5% of wages and salaries or $40,000 per annum. No estimates are available for industry rents or public sector rent, but they are assumed to be very modest.

The following table provides mineral exploration expenditures data for B.C. and the North Cascades between 1970 and 2002, as reported in the MEM ARIS database.

[34] Ministry of Energy and Mines, Minfile Capsule Geology and Bibliography, Inventory Report for Giant Copper, 092HSW001.

[35] Based on a survey undertaken by Maki and Sunderman for BC Stats; as mentioned in the *Socio-Economic Base Case for the Southern Rocky Mountain Management Plan (SRMMP)*, 2002.

[36] Two of the operating mines are quarries that would on average generate 6.7 PYs of direct employment per $million dollar of expenditures, and an average of 2 PYs per pit or quarry (some 1,500 pits and quarries in B.C. employ 3,000 workers). Source: Glenn E. Bridges & Associates Inc., *Construction Aggregates – Building Block Profile*, B.C. Ministry of Sustainable Resource Management, 2002. The estimate of 6 PYs of direct employment assumes that the third operating mine generates similar employment as each quarry.

Table 5 Mineral Exploration Expenditures for B.C. and North Cascades, 1970 to 2002

Year	BC ARIS Expenditures ($ millions)		Recovery Plan Area ARIS Expenditures ($ Millions)		Recovery Plan Area % of BC
	$ Current	$2002	$ Current	$2002	
1970	$3.7	$17.8	$0.14	$0.68	3.83%
1971	$3.1	$14.6	$0.11	$0.51	3.49%
1972	$3.2	$14.6	$0.08	$0.35	2.43%
1973	$4.1	$17.2	$0.19	$0.78	4.52%
1974	$7.3	$27.9	$0.08	$0.29	1.05%
1975	$7.1	$24.1	$0.35	$1.20	5.00%
1976	$6.4	$20.4	$0.18	$0.59	2.87%
1977	$8.8	$25.9	$0.19	$0.57	2.18%
1978	$12.1	$30.8	$0.44	$1.12	3.65%
1979	$19.9	$47.9	$1.11	$2.68	5.60%
1980	$33.2	$73.2	$0.96	$2.12	2.90%
1981	$45.8	$88.4	$0.84	$1.62	1.83%
1982	$21.7	$38.0	$0.72	$1.26	3.33%
1983	$29.6	$49.0	$0.66	$1.09	2.23%
1984	$28.2	$44.9	$0.22	$0.35	0.79%
1985	$28.5	$44.0	$0.24	$0.37	0.83%
1986	$64.6	$96.9	$1.06	$1.59	1.64%
1987	$79.4	$115.6	$1.61	$2.34	2.02%
1988	$75.8	$106.5	$1.97	$2.77	2.60%
1989	$61.2	$82.2	$1.39	$1.87	2.27%
1990	$63.8	$81.3	$0.70	$0.89	1.09%
1991	$56.1	$68.0	$0.17	$0.21	0.31%
1992	$27.1	$31.9	$0.24	$0.29	0.90%
1993	$16.8	$19.2	$0.11	$0.13	0.65%
1994	$34.9	$39.0	$1.70	$1.90	4.87%
1995	$31.4	$34.4	$1.85	$2.02	5.88%
1996	$46.7	$50.5	$2.19	$2.37	4.68%
1997	$51.7	$55.6	$1.39	$1.49	2.69%
1998	$22.5	$24.1	$0.37	$0.39	1.62%
1999	$12.1	$12.9	$0.15	$0.16	1.21%
2000	$13.6	$14.2	$0.07	$0.07	0.51%
2001	$15.9	$16.3	$0.16	$0.16	1.01%
2002	$19.1	$19.1	$0.16	$0.16	0.84%
Totals	$955.5	$1,446.4	$21.8	$34.4	2.38%
Annual Avg.	$29.0	$43.8	$0.7	$1.0	2.38%

Source: Ministry of Energy and Mines, Assessment Report Index (ARIS) Database on Mineral Exploration Expenditures, 2003.

APPENDIX 3 FORESTRY SECTOR

To measure the socio-economic significance of the timber resources in the Recovery Plan Area, which spans portions of four BC Ministry of Forests management units (Timber Supply Areas), several major assumptions were applied to data gathered from several different sources. The following paragraphs describe these sources of data and the significant assumptions made in its interpretation.

Timber Supply Area Data

The most recent timber supply reviews (TSR2) for each of the four Timber Supply Areas (Merritt, Fraser, Lillooet and Okanagan) supply data on the total land area, timber harvesting land base, allowable annual cut determination, employment coefficients and government revenue coefficients for each TSA. These data were applied as reported or derived in the TSR2 documents to generate the 'Entire TSA' level data in Table 1 of this report.

The economic impact indicators (employment coefficients and government revenue coefficients) are subject to wide year to year variability, and represent averages observed over several years leading up to the date of the TSR2 analyses. No attempt has been made in this report to adjust these indicators for more recent trends in employment or stumpage revenue generation in these TSAs (the completion dates of the TSR2 process range between June 1998 for the Fraser TSA and March 2001 for the Merritt TSA).

The coefficient estimates for employment and government revenues per 000m3 of timber harvested in each TSA were applied to the ultimate allowable annual cut determination (TSR2) to provide an indication of the employment and stumpage revenue generation potential of timber resources in each TSA.

Landscape Unit Data

The boundaries and names of the Recovery Plan sub-units correspond to landscape units used by the Ministry of Forests in landscape unit level management of forest resources. The following table demonstrates the landscape unit data used to generate the Recovery Plan estimates displayed in Table 1 of this report, and the several sources of the data are listed in the notes to the table.

Data on the amount of timber harvesting land base (THLB) in Core Area grizzly bear habitat in each landscape unit is available only for the Merritt TSA landscape units. The others are very imperfectly estimated by applying the known proportion of Core Area in each landscape unit to the known amount of timber harvesting land base in each landscape unit.

The estimates of potential socio-economic impact from timber resources in the Recovery Plan Area are driven by assumed harvest rates, and the employment and government revenue coefficients indicated at the TSA level. The allowable annual cut (AAC) for each TSA is determined by the Chief Forester based on timber resources and harvest sustainability across the entire TSA. The AAC cannot be fractured into smaller units covering some subset of the lands within a TSA. For the purposes of this impact assessment, landscape unit contributions to the overall AAC for a TSA are presumed to be directly proportional to the amount of timber harvesting land base (THLB) contained within a given landscape unit. There are many reasons why this may not be an appropriate assumption for any particular landscape unit, neither in the short term nor the long term.

Table 6 North Cascades THLB by Landscape Unit

Sub Unit	Total Area (km2)[1]	Core Area 2002 (km2)[1]	THLB in Core Areas (ha)[2]	THLB outside Core Areas (ha)[2]	Total THLB (ha)[3]
Fraser TSA Spine					
Ainslie	389.1	186.6			14,763
Anderson	522.1	215.2			22,447
Coquihalla	680.6	441.1			19,145
Manning East	432.3	383.7			
Manning West	892.1	770.5			5,684
Total	2,916.2	1,997.1			62,039
Merritt TSA Spine					
Coldwater	316.3	170.4	6,217	10,142	16,359
Similkameen	904.0	356.0	29,990	39,094	69,084
Spius	691.9	360.8	15,105	25,995	41,100
Tulameen	1,063.2	531.5	20,992	33,874	54,866
Total	2,975.4	1,418.7	72,304	109,105	181,409
Lillooet TSA Spine					
Siska	357.6	207.3			12,505
Total Spine Area	6,249.2	3,623.1			371,900
Fraser TSA Non-Spine					
Chilliwack	740.7	468.4			26,205
Fraser Valley South	106.7	53.2			8,407
Silverhope	567.4	398.7			19,457
Yale	214.1	141.6			16,485
Total	1,628.9	1,061.9			70,554
Merritt TSA Non-Spine					
Lower Nicola River	103.6	72.9	5,246	3,094	8,340
Otter	138.5	38.9	4,293	10,884	15,177
Smith-Willis	696.4	267.8	23,217	32,636	55,853
Total	938.5	379.6	32,756	46,614	79,370
Okanagan TSA Non-Spine					
Ashnola	990.9	801.8			10,589
Total Non-Spine Area	3,558.3	2,243.3			
Recovery Plan Totals					
Fraser TSA	4,545.1	3,059.0			132,593
Merritt TSA	3,913.9	1,798.3	105,060	155,719	260,779
Lillooet TSA	357.6	207.3			12,505
Okanagan TSA	990.9	801.8			10,589
Total	9,807.5	5,866.4			416,466

Notes:

1. From Okanagan Wildlife Consulting (Les Gyug), *North Cascades Grizzly Bear: Foraging Suitability, Habitat Effectiveness and Wildlife Habitat Area Proposals*, June 30,2003, Table 12, Pg.30.
2. From Ministry of Forests Vancouver Forest Region (Craig Robinson, Timber Supply Forester), *North Cascades Grizzly Bear Recovery Plan, Technical Assessment of Timber Supply Impacts*, May - 2000, Pg. 3.
3. Assembled from several sources including: Chilliwack Forest District Landscape Unit Planning (Lucy Stad, Harry Gill, Greg George and Mike Smith), *Fraser Canyon Landscape Units - Background Report*, May 2002; Email from Mike Smith, Chilliwack Forest District, Oct.14/03; Telephone conversation with Don Embury, Cascades Forest District, Oct. 21/03; and Timberline Forest Inventory Consultants, *Okanagan Innovative Forestry Practices Agreement Uplift Analysis*, June 2002.

Table 7 Net Economic Value from Forest Sector in Recovery Plan Spine Area

Annual Net Economic Value		Recovery Plan Area
Public Sector Rent	$19.08 per m3 (stumpage)	$13.8 million
Labour Rent	5 % of direct wages and salaries	$1.9 million
Industry Rent	Minimal	Minimal
ANNUAL NET ECONOMIC VALUE		$15.7 million

Notes: May not add due to rounding

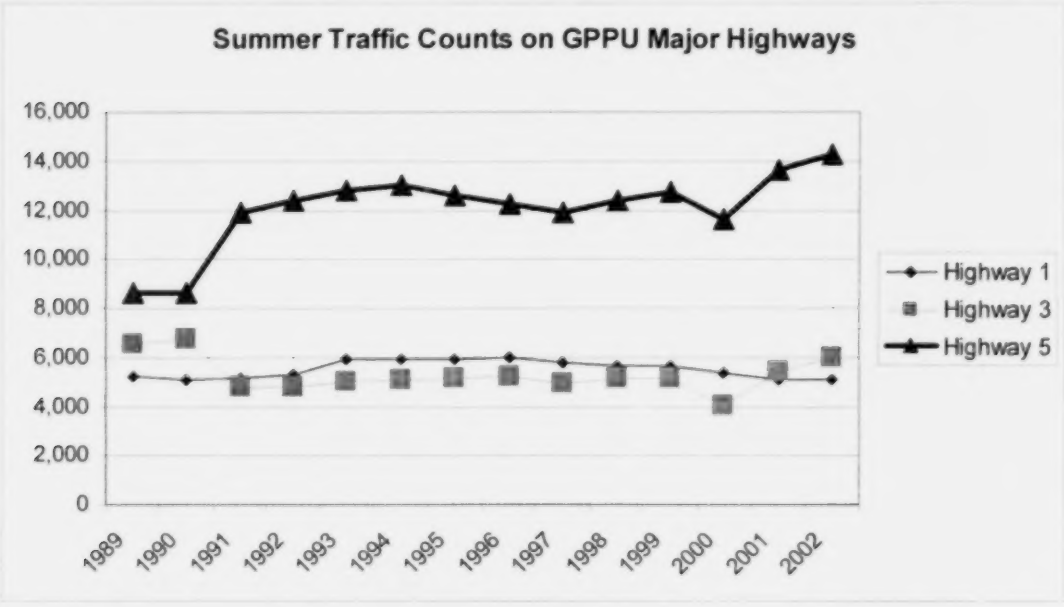
1. Based on the Recovery Plan Spine area accounting for an estimated AAC of 721,049 m3.
2. Labour rents are based on the Spine area generating 758 PYs of direct employment (1.05 per 000 m3) and wages and salaries of $50,000 per direct PY of employment.
3. Industry rents are considered minimal; between 1995 and 1999, the B.C. forest industry reported total earnings before taxes that averaged 0.8% of total sales revenues and a 5-year average return on capital of 2.9%, which is below what might be considered a "reasonable average return". PriceWaterhouseCoopers, *The Forest Industry in British Columbia, 1999*.

APPENDIX 4 TRANSPORTATION SECTOR

There are three major highways through the Recovery Plan area: the TransCanada Highway (#1) along the Fraser Canyon; the Hope-Princeton Highway (#3); and the Coquihalla Highway (#5). Over 20,000 vehicles travel through the North Cascades on a daily basis during the summer months. This includes approximately 5,000 vehicles on Highway 1, almost 6,000 vehicles on Highway 3, and some 14,000 vehicles on Highway 5.

The following chart provides traffic count data for selected locations along the three highways. The data show that traffic through the North Cascades has remained relatively stable since 1991. As shown on the chart, there was a traffic shift from the Hope-Princeton Highway to the Coquihalla Highway in 1991 as a result of the completion of the Okanagan connector (Highway 97) between Merritt and Peachland in 1990.

Chart 4 Summer Traffic Counts Through North Cascades



Notes:

1. The traffic count location on Highway 3 changed in 2000 from Allison Pass to the current location at Nicolum Creek Bridge, 4.3 km east of Route 5, east of Hope.
2. The traffic count location on Highway 5 changed in 2000 from 2.4 km south of the Coquihalla tollbooths to 12 km north of Route 3, north of Hope.
3. The data for Highway 1 is from the counter at the north end of the China Bar Tunnel, approx. 58 km north of Hope.

Source: B.C. Ministry of Transportation and Highways, various years.

APPENDIX 5 AGRICULTURE SECTOR

The following tables provide data on Animal Unit Months for the Recovery Plan area and for B.C., as well as the socio-economic impacts associated with the beef cattle industry.

Table 8 Animal Unit Months of Crown Land Grazing in the Recovery Plan Area

	Approx. AUMs in Recovery Plan Area (note 1)	% of Total in Recovery Plan Area
Outside Spine:		
Smith-Willis & Ashnola	7,572	16%
Lower Nicola River	1,444	3%
Sub-Total	9,016	19%
Within Spine: Similkameen, Tulameen, Coldwater, Otter, Spius and Siska	38,436	81%
Total Recovery Plan Area	47,452	100%
	AUMs	Recovery Plan Area (%)
Total Cascades Forest District	149,541	32%
Total British Columbia	897,000	5%

Notes:

1. Data on Animal Unit Months were estimated for the Recovery Plan area based on data provided by the Cascades Forest District; the information is approximate as some of the range tenures and agreements overlap between Grizzly Bear Population Sub-Units.
2. For the most part, the range tenures in the Otter sub-unit overlap those of the Coldwater sub-unit, and as a result, they are included as part of the Spine Area.
3. Animal Unit Month (AUM) - The unit by which forage or grazing capability of Crown rangeland is measured. It represents the amount of forage required for one month by an average cow, aged 6 months or older.

Table 9 Socio-Economic Impacts of Beef Production

Selected Impact Data:	Total B.C.	B.C. Per AUM	Estimate for Recovery Plan	Estimate for Spine Area
AUMs	897,000 AUMs		47,452	38,436
Percentage of AUMs			5.3%	4.29%
Total Herd	707,756 Animals	0.79	37,441	30,327
Value of Production	$225 Million	$251	$11.9	$9.6
Direct Employment	7,500 Persons	0.01	397	321
Government Revenues:				
Range Fees	$2 Million	$2.2	$105,802	$85,699
Land and Property Taxes	$9 Million	$10.0	$476,107	$385,645
Net Economic Value:		Percentage		
Industry/Labour Rent	$11 Million	5%	$595,134	$482,057
Range Fees	$2 Million		$105,802	$84,559
	$13 Million		$700,935	$567,756

Note: Farm labour typically includes the owner operators, with seasonal workers during peak periods of stock handling and crop harvesting; net economic value accruing to the owner/operator/workers is assumed to be 5% of production value.

Source: Based on following sources: B.C. Ministry of Forests data, Cascades Forest District for 2003; B.C. data are from: B.C. Ministry of Agriculture, Food and Fisheries, *2003/04-2005/06 Service Plan*, 2003, www.bcbudget.gov.bc.ca; Economic Impact data are from: B.C. MSRM (Grant Henry), *Beef Production - An Economic Profile*, 2003.

APPENDIX 6 RECREATION SECTOR

The North Cascades Recovery Plan states that "16.9% of the area is within the provincial parks and protected areas."[37] When the recently protected Snowy Protected Area is added, as much as 20% of the Recovery Plan is within parks and recreation areas. The parks and other protected areas offer a wide range of frontcountry and backcountry recreation opportunities. This Appendix reviews the socio-economic impacts associated with parks and protected areas in the North Cascades, as well as the socio-economic impacts associated with four major types of backcountry recreation including resident hunting, resident angling, wildlife viewing and snowmobiling.

Appendix 6-1 Parks and Recreation Areas

Park Area and Number of Visits

The Recovery Plan area covers approximately 1% of the total B.C. area. Major provincial parks in the North Cascades include Manning, Cathedral, Skagit Valley and Chilliwack Lake. Protected areas, recreation areas and ecological reserves account for 19.5% of the Recovery Plan area and 1.69% of all protected areas in B.C.

While parks and recreation areas in the North Cascades account for approximately 1.7% of all parks and recreation areas in B.C., they account for 6.4% of all park visits in B.C.

Table 10 Number of Visits to B.C. Parks and Recreation Areas, 2000

	Approx. Square Km	% of Protected & R.A.	Number of Parties		Approx. Visits
			Day Use	Camping	
NORTH CASCADES SPINE AREA:					
E.C. Manning			130,228	29,087	548,876
E.C. Manning Park Lodge Road			223,817		783,360
Total E.C. Manning Park	709	37%	354,045	29,087	1,332,236
Skagit Valley Provincial Park	280	15%	8,421	4,426	43,637
Cascade Recreation Area	119	6%	3,567		12,485
Coquihalla Summit Recreation Area	58	3%			n/a
Sub-Total	1,166	61%	366,033	33,513	1,388,357
IN NORTH CASCADES - OUTSIDE SPINE:		0%			
Cathedral Park & Protected Area	334	18%	10,179	5,049	51,783
Chilliwack Lake Provincial Park	93	5%	12,725	7,362	68,096
International Ridge	19	1%			N/A
Liumchen Creek Ecological Reserve	22	1%			N/A
Snowy Protected Area	259	14%			N/A
Other:	4.0	0%			N/A
Sub-Total	730.2	39%			
Total Protected & Recreation Areas	1,896	100%	388,937	45,924	1,508,236
PLAN AREA:					
Total Spine Area	6,225	18.7%			
Other Areas	3,582	20.4%			
Total Recovery Plan Area	9,807	19.3%			

[37] Ibid, page 38.

Notes to Table:

1. Number of visits is based on 3.5 visits per party for day use visits and 3.2 visits per party for camping use visits.
2. The number of day and camping visits for Manning Park includes visits to 7 camping areas and 10 day use areas, all with road access. Data are not readily available for the camping sites in remote areas.
3. The area for Cathedral Park includes 3.53 square kilometres for the Cathedral Protected Area.
4. Other smaller provincial parks include Skihist (33 hectares), Coldwater River, Alexandra Bridge (55 hectares), Nicolum River (24 hectares), part of Cultus Lake and Chilliwack River.
5. Other smaller recreation areas include Coquihalla River (103 hectares) and Coquihalla Canyon (150 hectares).
6. Other smaller Ecological Reserves include Skihist, Stoyoma Creek, Whipsaw Creek, Skagit River Cottonwoods, Skagit River Forest and Skagit River Rhododendrons.
7. The park areas are consistent with the BC Parks web site and the B.C. MWLAP 2003 study titled North Cascades Grizzly Bear: Foraging Suitability, Habitat Effectiveness Analysis, and Wildlife Habitat Area Proposals.

Source:

BC Parks, *2000 Provincial Park Attendance in Parties*, 2000.
Recovery Plan Area is from: *Recovery Plan for Grizzly Bears in the North Cascades*, 2003, page 62 (Appendix 5).

Activities Offered by Major Parks and Recreation Areas

Parks and recreational areas in the North Cascades offer a variety of lodging options and a broad range of recreational activities. These include:

- Approximately 700 camping sites with road access and another 200 backcountry sites without public road access.

- Manning Park Resort, a 73 room resort (41 rooms as part of the lodge, a 13 bedroom chalet, and various cabins and smaller 2 to 3 bedroom chalets). Winter activities offered by the resort include downhill skiing and snowboarding, snowshoeing, outdoor skating and tubing. Summer activities include hiking, water sports, biking and nature programs. The resort also offers three licensed restaurants, a gift shop and various meeting rooms.

- Cathedral Lakes Resort, a 21 room resort comprising a main lodge and 5 different size cabins. The lodge is located 16 km from the park boundary and is accessible by the resort jeep service. The trip takes about one hour and climbs over 1500 meters. There are approximately 70 backcountry camping sites near the lodge and Cathedral Lake Resort also offers transportation services to campers.

- A wilderness rustic log cabin in the Cascade Recreation Area, which is reserved for the Backcountry Horsemen Association in the summer months.

- An extensive network of hiking and walking trails.

- Some horseback trail riding facilities particularly in the Cascades area; there are limited trails in Manning Park, the Skagit Valley, Chilliwack Lake and the Snowy Protected Area.

- Hunting is permitted in most parks except in Manning Park and in the core area of Cathedral Park (the core area represents the main camping and lodge area some 16 km from the park boundary).

- Snowmobiling is not permitted in parks and protected areas in the North Cascades, although it is permitted in the Granite Mountain area in the north east of the Cascade Recreation area.

The following tables summarize the activities offered by each Provincial Park and Recreation Area in the North Cascades.

Table 11 Number of Provincial Park Campsites and Visits to Recovery Plan Area

	Approximate Number of Campsites			Camping (2000 data)		Visits per Site	
	Front Country	Back Country	Total	Parties	Visits	Front Country	Back Country
Parks:							
E.C. Manning	355	55	410	29,087	93,078	262	
Cathedral - Buckhorn	0	n/a	n/a	1,019	3,261		
Cathedral - Core Area	3	70	73	4,030	12,896		184
Skagit Valley	185	0	185	4,426	14,163	77	
Chilliwack Lake Provincial Park	146	24	170	7,362	23,558	161	
International Ridge	0	0	0				
Recreation Areas & Ecological Reserves:							
Cascade Recreation Area	0	53	53	n/a	n/a		
Snowy Protected Area	0	0	0				
Coquihalla Summit Recreation Area	0	0	0				
Liumchen Creek Ecological Reserve	0	0	0				
Total	689	202	891	45,924	146,957		

Notes:
1. Number of camping visits are based on 3.2 visits per party
2. The number of day and camping visits for Manning Park include visits to 7 camping areas and 10 day-use areas, all with road access. Data are not readily available for the camping sites in remote areas.

Source: BC Parks, *2000 Provincial Park Attendance in Parties*, 2000

Table 12 Activities Offered by B.C. Parks and Recreation Areas in Recovery Plan Area

	Camping Sites with Road Access	Back Country Sites	Cabins/ Lodges	Boating/ Fishing	Hiking/ Walking Trails	Cycling	Horseback	Snow-mobiling	Seasons of Use	Hunting
Parks:										
E.C. Manning	355	55	Manning Park Lodge	Boating area with road access	yes	On some trails	On some trails	no	all year	no
Cathedral	3	70	Cathedral Lakes Resort	Glacier lakes, no road access	yes	no	Limited to some areas, by letter of permission only	no	no winter accommodation	hunting is permitted except in Core Area of park (near lodge & most camping)
Skagit Valley	185	0	no	Boating area with road access on Ross Lake	yes	Limited to Roads	yes - 50 km	no	no winter camping	yes
Chilliwack Lake Provincial Park	146	24	no	Boating area with road access	yes	Limited to Roads	Only on Trans Canada Trail	no	no winter camping	yes
Recreation Area and Other										
Cascade Recreation Area	0	53	Wilderness rustic log cabin - reserved for Backcountry Horsemen in summer months	Limited	yes	Permitted in northeast portion	Popular summer activity, allowed at all wilderness camps	Permitted in Granite Mountain area in North East	all year	yes
Snowy Protected Area	0	0	no	no	yes	no	yes - 50 km	no	no winter camping	no
Total	689	202								

Source: BC Parks.

Economic Impact and Net Economic Value of Provincial Parks and Recreation Areas

In 2001 BC Parks prepared an economic impact study of B.C.'s parks and recreation areas. The study estimated the direct, indirect and induced impacts in terms of direct BC Parks expenditures, visitor expenditures, gross domestic product, and employment. Based on this analysis and the number of visits calculated for the Recovery Plan area, the Provincial Parks and Recreation Areas in the North Cascades generate some 583 FTEs of direct, indirect and induced employment through direct park operations and through visitor spending on food, lodging, vehicle operations and other recreational services.

Consumers may derive value from the parks beyond what is being spent on park facilities and visitor related expenses (consumer surplus). BC Parks commissioned Coopers and Lybrand to complete an economic impact study of parks in 1995/1996, which provides estimates of consumer surplus associated with BC Parks. In that study, the consumer surplus per user day is estimated at $31 per user day for day use and at $33 per user day for camping visits ($1994). The BC Parks statistics for park attendance likely include a high proportion of day users who use the park for a very short visit. BC Parks reports that in 2000, some 354,045 parties visited Manning Park, of which 223,817 parties were reported at the E.C. Manning Park Lodge road park site. By comparison, the annual vehicle count through Manning Park (Allison Pass) is estimated at approximately 1.17 million vehicles (or an annual average daily traffic of 3,200 vehicles times 365 days[38]). The number of parties visiting Manning Park annually as reported by BC parks therefore represents approximately 30% of all vehicle traffic through the park. This implies that a large proportion of daily visitors to the park are likely to be stopping only briefly in the park, therefore deriving a much lower consumer surplus than the $31 per user day for day use estimated above.

The BC Parks statistics for camping visits assume that each camping party has 3.2 individuals. Assuming that each camper derives a consumer surplus of $33 per user day from the use of the park will yield an annual net benefit of approximately $5 million per year. The following table summarizes selected economic impact data for parks and recreation areas in B.C. as well as estimates for the North Cascades Recovery Plan Area.

Table 13 Selected Economic Impact Data for B.C. Parks and Recreation Areas

	B.C.	Recovery Plan Area	% of B.C.
Area (Square KM):			
Total Area	962,723	9,807	1.02%
Parks, Recreation Areas and Ecological Reserves	113,505	1,896	1.67%
%	11.79%	19.33%	
Park Facilities & Attendance (2002):			
Number of Campsites (vehicle accessible)	12,969	689	5.31%
Number of Visits:			
Camping Visits (vehicle accessible)	2,634,934	146,957	5.58%
Day Use & Boat Use visits	20,909,351	1,361,280	6.51%
Total Visits	23,544,285	1,508,236	6.41%
Estimated Economic Impacts (1999):			
Recovery Plan area accounts for 6.4% of B.C. Impacts:			
1999 Visits	24,271,004		
Direct Expenditures	$533 million	$34 million	6.4%

[38] B.C. Ministry of Transportation, 2000.

	B.C.	Recovery Plan Area	% of B.C.
Total Provincial GDP Impact	$521 million	$33 million	6.4%
Employment			
Direct Employment from Operations (FTEs)	799 FTEs	51 FTEs	6.4%
Indirect and Induced FTEs from Operations	560 FTEs	35 FTEs	6.4%
FTEs of Employment from Visitor Spending	7,753 FTEs	497 FTEs	6.4%
Total FTEs	9,112 FTEs	583 FTEs	6.4%

Notes:
1. FTE: Full Time Equivalent.
2. Employment from operations includes B.C. Parks employees (355 FTEs), Contractors and Youth Team employees (444 FTEs), and indirect and induced FTEs (560 FTEs).
3. Direct expenditures include the combined effects of visitor expenditures ($486 million) and B.C. Parks operational budget including park operations, contractors & youth employment programs ($47 million).

Source: BC Parks. B.C. Ministry of Water, Land and Air Protection, *Economic Benefits of B.C.'s Provincial Parks*, 2001.

Appendix 6-2 Recreation in Provincial Forests

The following tables summarize the B.C. estimates for recreation activities in provincial parks, recreation areas and provincial forests. Provincial forests include all crown forests, which are outside areas that are designated as Provincial Parks and Recreation Areas.

Table 14 1993 Estimates of Recreation Visits to B.C. Parks and Provincial Forests

	Million of Visitor Days			
	Residents	Non-Residents	Total	% of Total
Provincial Parks & Rec. Areas	17.8	4.9	22.7	
Regional Parks & Rec. Areas	6.0	0.0	6.0	
National Parks	3.6	3.7	7.3	
Sub-Total Parks & Rec. Areas	27.4	8.6	36.0	41%
Provincial Forests	45.0	7.0	52.0	59%
Total	72.4	15.6	88.0	100%
Visits to Provincial Forests:				
Roaded Areas			34.4	66%
Unroaded Areas			17.6	34%
Total			52.0	100%

Source: Ministry of Forests, *Forest, Range & Recreation Resource Analysis*, 1994, pages 180 to 184.

Table 15 Recreational Use of Provincial Forests by Forest Region, 1993

	Residence of Users (%)	Destination of Use (%)
Vancouver FR	66%	52%
Kamloops FR	12%	18%
Nelson FR	8%	11%
Cariboo FR	3%	6%
Prince George FR	6%	7%
Prince Rupert	5%	6%
	100%	100%

Some key findings from the data:

- In 1993, BC Parks estimated that recreational visits in provincial forests (52 million visits) exceed the number of recreational visits to parks and recreation areas in B.C. (36 million visits).

- In 1993, residents from the Vancouver Forest Region accounted for 66% of all visits to all provincial forests. About 78% of this use remained in the Vancouver Forest Region, 10% was in the Kamloops Forest Region and the balance was elsewhere in the province. This confirms the importance of the North Cascades as a key destination for Lower Mainland residents.

- Two thirds of all recreational visits to B.C.'s provincial forests are in roaded areas and the other third are in unroaded areas (backcountry).

Provincial forests offer the same activities that are offered in parks and recreation areas such as hiking, fishing, cross country skiing and other non-motorized activities. In addition, however, provincial forests offer backcountry activities that are not always, and sometimes not at all, permitted in Provincial Parks and Recreation Areas. These include:

- Snowmobiling activities: snowmobiling is a very popular activity in the North Cascades provincial forests with snowmobiling taking place along the TCT/Kettle Valley trail, the Thynne Mountain snowmobiling trails, etc.

- Off-road motorized recreation activities: this includes 4X4 backcountry driving, All terrain Vehicles (ATVs) and motorcycles/motorcross. The North Cascades have an extensive network of logging roads. Some backcountry trails for ATVs and motorcycles/motorcross include the Stoyoma Mountain recreation area in the north of the GBPU, the Sutter Creek Recreation site area, Wells Lake area, Tanglewood Hills and many others.

- Horseback riding activities: horseback riding is allowed on some trails in all of the parks and recreation areas in the North Cascades, but in some of the parks, horseback riding is limited to some of the major trails, for example the Centennial trail through the Skagit Valley Park and the Similkameen West Trail and Pacific Crest Trail in Manning Parks. By comparison, horseback riding in provincial forests is allowed on all major recreation trails.

- Activities that are non-motorized but are nevertheless not permitted in all areas of the parks and recreation areas. These include bicycling and hunting.

Provincial forests offer an extensive network of trails. The North Cascades includes a portion of the Trans Canada Trail (TCT)/ Kettle Valley Railway line, an abandoned railbed acquired by the Government of B.C. to serve as a major recreation trail across Southern British Columbia. The TCT/Kettle Valley trail links Hope and Brookmere along the Coquihalla Highway providing a scenic route across the North Cascades for 5 main activities: biking, hiking, horseback riding, cross-country skiing and snowmobiling. The TCT/ Kettle Valley trail also links Brookmere to Princeton following the east side boundary of the North Cascades area.

In 1999, the B.C. government conducted open houses on the TCT/Kettle Valley trail in various communities including Ladysmith, Chilliwack, Princeton, Penticton, Grand Forks, Trail, Cranbrook and Sparwood. Of the 679 people who attended the sessions, 440 provided data on level of use through written surveys. Of those who provided written comments, 39% are from Chilliwack, Princeton and Penticton, 47% are from the Kootenays, 8% are from Vancouver Island, and 6%

sent in comments by fax and mail from various communities throughout B.C.

The results were as follows.

Chart 5 Open House Results on Intended Use of Trans Canada Trail in B.C.

Source: B.C. Ministry of Sustainable Resource Management, *Trans Canada Trail Consultations, A Report on Public Input*, March 1999.

Provincial forests do not have the same camping and road accessed facilities as Provincial Parks. The Ministry of Forests, however, supports recreation camping sites and recreation trails. In the Recovery Plan area, there are 27 recreation sites and 22 recreation trails.

Table 16 Number of Recreation Sites and Trails in the Recovery Plan Provincial Forests

Forest Districts	Recreation Sites		Recreation Trails	
	Spine Area	Outside Spine	Spine Area	Outside Spine
Cascades	19	(a)	12	(a)
Penticton	-	2	-	1
Chilliwack	-	6	-	9
Total	19	8	12	10

Note:
(a) The Cascades Forest District recreation sites and trails are mainly in the spine areas, however, there might be one or two in the Otter and the Lower Nicola Grizzly Bear Population sub-units that are outside the Spine area.
Source:
Ministry of Forests Chilliwack Forest District maps.
Recovery Plan for Grizzly Bears in the North Cascades of B.C., 2003, page 53.

There are numerous motels, lodges and cabins along BC.'s provincial highways that provide accommodation to individuals who recreate in provincial forests in the North Cascades. There are also cabins, which are maintained by clubs and associations throughout provincial forests in B.C. The Cheam Whiskey Jacks Snowmobile Club, a volunteer organization based in Chilliwack offers 3 club cabins in the Coquihalla and Merritt region, which are maintained by the club's 140

members.[39]

Data on the number of recreational visits to provincial forests in North Cascades are not available. Data on activities in provincial forests and our knowledge of the North Cascades area, however, allow us to make the following observations:

- It is likely that the number of recreational visits to provincial forests in the North Cascades is at least as high as for parks and recreational areas, at least for day use.

- The nature of the activities that take place in the provincial forests is different than in parks as parks do not permit motorized activities and restrict some activities like horseback riding and bicycling.

- The three highways that cross the North Cascades render the provincial forests as accessible as the parks in the area. Traffic counts through the North Cascades along the Coquihalla Highway during the summer months are approximately 14,000 per day, or almost 3 times the traffic of the Fraser Canyon and 2.5 times the traffic along Highway 3 through Manning Park between Hope and Princeton (Park visits exclude data on the Coquihalla Summit Recreation Area).

- The North Cascades provincial forests offer a network of hiking trails, backcountry and snowmobiling facilities that are significant to the province.

The next section reviews some of the activities that take place in provincial parks, recreation areas and provincial forests in more detail.

Appendix 6-3 Resident Hunting

The B.C. Ministry of Water Land and Air Protection (MWLAP) provided hunting effort data between 1990 and 2002 for each Wildlife Management Unit in the North Cascades. The data are summarized following:

Table 17 Summary Data on Hunting Effort in the North Cascades Recovery Plan Area

	Total Recovery Plan Area		
Annual Averages, 1990-2002	Resident	Non-Res.	Total
Kills	1,136	32	1,168
Hunters	5,382	47	5,429
Hunter Days	27,245	201	27,447
Net Economic Value $	$1,411,218		

Notes: Does not add due to rounding.

1. Includes only big game hunting effort (black bear, cougar, elk, moose, mule deer, white tailed deer, mountain sheep).
2. Regional annual data can vary widely and the data were averaged for the years 1990 to 2002.

Source: B.C. Ministry of Water, Land and Air Protection, Wildlife Branch. The tables at the end of this section provide more detail.

The B.C. MWLAP data show that on average, there are 5,382 resident hunters per year who visit

[39] **Source**: Cheam Whiskey Jacks Snowmobile Club web site.

the North Cascades, and that each hunts an average of approximately 5 days in that region. Of the 1,136 big game animal kills by local residents in the North Cascades, 84% are mule deer kills, 11% are black bear kills and the balance are other big game animals.

The proximity of the North Cascades to the Lower Mainland and Okanagan populations make it a convenient hunting area for B.C. residents. For mule deer, for example, the number of resident hunters in the North Cascades represents 8% of all B.C. resident hunters for mule deer in 2001/2002 and approximately 5% of mule deer hunter days and 5% of the mule deer kills (by comparison, the North Cascades represents 1% of the B.C. landbase). The North Cascades area attracts 7% of all BC resident black bear hunters in B.C., and accounts for 3% of black bear hunter days, and 4.5% of the black bear kills by B.C. residents.

The B.C. MWLAP data also show that while the North Cascades is an important area for resident hunters, it is not as significant for non-residents. Non-resident hunting in the North Cascades accounts for only 1.3% of B.C.'s non-resident black bear hunters, 0.9% of B.C.'s non-resident hunter days and 1.6% of the black bear kills.

The B.C. MWLAP estimates the net economic value per year associated with the hunting effort in the North Cascades at $1.4 million for B.C. resident hunters. This estimate uses a contingent valuation method in conjunction with a survey of actual expenditures to determine the net economic value or consumer surplus associated with resident hunting activities. Approximately $1 million is in the Spine Area of the North Cascades (71%), and $0.4 million is outside the Spine Area (29%), which corresponds roughly to the landbase within the Spine (63%) and outside the Spine (37%).

Table 18 Hunting Effort for Recovery Plan Area and B.C. for Selected Species

	Total Recovery Plan Area			% of Total	B.C. 2001/2002 Hunting Season			North Cascades as a % of BC		
	Resident	Non-Res	Total		Resident	Non-Res	Total	Resident	Non-Res	Total
Black Bear										
Kills	128	21	148	12.7%	2,814	1,294	4,108	4.5%	1.6%	3.6%
Hunters	528	29	556	10.2%	7,609	2,253	9,862	6.9%	1.3%	5.6%
Hunter Days	2,341	125	2,467	9.0%	74,823	13,688	88,511	3.1%	0.9%	2.8%
$Value[3]	91,358	26,364	117,722	8.1%						
Elk										
Kills	14	0	14	1.2%	1,876	290	2,166	0.8%	0.0%	0.7%
Hunters	395	1	396	7.3%	8,948	710	9,658	4.4%	0.1%	4.1%
Hunter Days	2,824	6	2,830	10.3%	93,943	4,718	98,661	3.0%	0.1%	2.9%
$Value[3]	119,458	1,494	120,953	8.3%						
Mule Deer										
Kills	950	0	950	81.3%	18,812	0	18,812	5.0%		5.0%
Hunters	3,839	0	3,839	70.7%	45,597	0	45,597	8.4%		8.4%
Hunter Days	18,839	0	18,839	68.6%	418,554	0	418,554	4.5%		4.5%
$Value[3]	1,029,578	0	1,029,578	70.6%						

Source:
Ministry of Water, Land and Air Protection - Wildlife Branch, *Summary Statistics Data Base, Hunter Harvest and Effort.*
Ministry of Water, Land and Air Protection - Wildlife Branch, *Big Game Hunting Statistics for the 2001/02 Season.*

Table 19 Hunting Effort for Selected Species for Recovery Plan Area
Annual Averages 1990-2002 in the Recovery Plan Area

	Total Spine[1]			Total Non-Spine[2]			Total Recovery Plan Area			% of Total
	Resident	Non-Res.	Total	Resident	Non-Res.	Total	Resident	Non-Res.	Total	
Black Bear										
Kills	101	14	115	27	6	33	128	21	148	12.7%
Hunters	405	18	423	123	11	134	528	29	556	10.2%
Hunter Days	1,763	78	1,841	579	47	626	2,341	125	2,467	9.0%
$Value[3]	67,660	16,518	84,177	23,699	9,846	33,545	91,358	26,364	117,722	8.1%
Cougar										
Kills	8	4	12	1	4	5	9	8	17	1.4%
Hunters	17	6	23	8	4	12	25	10	35	0.6%
Hunter Days	110	21	131	54	14	69	165	35	200	0.7%
$Value[3]	10,326	8,758	19,084	6,522	5,923	12,445	16,848	14,681	31,529	2.2%
Elk										
Kills	10	0	10	4	0	5	14	0	14	1.2%
Hunters	299	1	299	96	0	96	395	1	396	7.3%
Hunter Days	2,068	4	2,073	756	1	757	2,824	6	2,830	10.3%
$Value[3]	87,493	1,116	88,608	31,966	379	32,344	119,458	1,494	120,953	8.3%
Moose										
Kills	13	0	13	2	0	2	15	0	15	1.3%
Hunters	189	0	190	41	3	44	231	3	234	4.3%
Hunter Days	999	2	1,001	219	14	233	1,218	16	1,234	4.5%
$Value[3]	50,891	291	51,181	11,312	822	12,134	62,203	1,113	63,316	4.3%
Mule Deer										
Kills	668	0	668	282	0	282	950	0	950	81.3%
Hunters	2,722	0	2,722	1,117	0	1,117	3,839	0	3,839	70.7%
Hunter Days	13,092	0	13,092	5,747	0	5,747	18,839	0	18,839	68.6%
$Value[3]	710,108	0	710,108	319,471	0	319,471	1,029,578	0	1,029,578	70.6%
White Tailed Deer										
Kills	12	0	12	4	0	4	16	0	16	1.4%
Hunters	245	0	245	78	0	78	324	0	324	6.0%
Hunter Days	1,299	0	1,299	363	0	363	1,662	0	1,662	6.1%
$Value[3]	60,899	0	60,899	17,388	0	17,388	78,286	0	78,286	5.4%
Mountain Sheep										
Kills				5	3	8	5	3	8	0.7%
Hunters				41	4	46	41	4	46	0.8%
Hunter Days				196	19	215	196	19	215	0.8%
$Value[3]				13,486	2,544	16,031	13,486	2,544	16,031	1.1%
Total										
Kills	811	19	830	325	14	339	1,136	32	1,168	100.0%
Hunters	3,877	24	3,902	1,505	23	1,527	5,382	47	5,429	100.0%
Hunter Days	19,331	106	19,437	7,914	95	8,010	27,245	201	27,447	100.0%
$Value[3]	987,376	26,682	1,014,057	423,843	19,515	443,357	1,411,218	46,196	1,457,415	100.0%

Notes:

1 Includes all of Wildlife Management Units 2-1, 2-2, 2-17, 3-13, 3-14, and 8-5.

2 Includes all of Wildlife Management Units 2-3, 8-3, and 8-4.

3 Represents 'Net Economic Value' which is measured as the value of hunting to hunters over and above the costs incurred by hunters ($1999) - i.e. consumer surplus.

4 This analysis estimates the socio-economic impacts to British Columbia, and as a result, the non-resident consumer surplus/ net economic value is not relevant to this analysis.

Source: Ministry of Water, Land and Air Protection - Wildlife Branch, *Summary Statistics Data Base, Hunter Harvest and Effort.*

Appendix 6-4 Resident Angling

There is very little information available on the economic and social significance of resident angling activities in the North Cascades Recovery Plan Area. Data from the Federal Department of Fisheries and Oceans 1995 National Survey of Recreational Fishing[40], indicates the following:

- 1995 freshwater angling effort in BC was 6,288,031 angler days.
- B.C. resident anglers accounted for 90% (5.7 million angler days) of angling effort.
- Of the 6.3 million freshwater angler days, 18% occurs in the Lower Mainland, 16% in the Thompson Nicola, 9% in the Okanagan and the balance or 57% is split about evenly between the Kootenay, Vancouver Island, Cariboo, Skeena and Omineca Peace.

In the Thompson Nicola/Kamloops region, the areas most popular for lake fishing are east of Tulameen and east of the Coldwater River and the North Cascades area boundary. For example, in its listing of commercial recreation tenures, Land & Water B.C. (LWBC) lists approximately 40 fishing and/or hunting camps in the Kamloops region, but none are in the Recovery Plan area.[41] The LWBC listing of commercial recreation tenures does not necessarily represent all commercial tenures.

While most of the fishing activity in the Thompson region is outside the North Cascades, there are nevertheless, some popular fishing lakes in the North Cascades as well. Many have B.C. Forest Service recreation sites including Wells Lake and Lodestone Lake near Coalmont; and Wolfe Lake, Lorne Lake, Jameson Lake and Placer Lake south of Princeton. For most of these lakes, access by 4X4 is recommended.

Fishing in streams and rivers is popular in Southwest B.C. and the Kamloops regions, although with so many lakes, fishing in streams and rivers is often overshadowed by lake fishing opportunities. The Fraser River offers fishing for salmon, sturgeon, steelhead and cutthroat trout. Fishing for trout, steelhead, dolly varden and many other species take place along most rivers and streams in the North Cascades. This includes the Chilliwack River, Coldwater River, Coquihalla River, Lawless Creek, Otter Creek, Tulameen River, Yale Creek and Similkameen River. Steelhead fishing is popular on the Thompson River on the northern boundary of the North Cascades. The Fraser River Fishing Lodge based in Chilliwack offers guided angling for salmon, sturgeon, steelhead and trout.

There are no data on the number of angler days associated with the recreational fishery in the North Cascades region.

Appendix 6-5 Wildlife Viewing

No direct measures of the extent of wildlife viewing activities in the North Cascades are available, however a provincial study on the economic value of these activities[42] provides some data from

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[40] Joint BC Government-Sector Steering Committee, *BC's Freshwater Recreational Fishery: Setting Direction For The Future – Context Report*, 2002, pg. 19 and 20.
[41] Land & Water B.C., lwbc.bc.ca/applying_for_land/crti/tenures.
[42] Roger Reid, *Economic Value of Wildlife Activities in British Columbia, 1996* , BC Ministry of Environment, Lands and Parks, Victoria, 1998.

which an indication of the extent and value of these activities can be estimated.

The provincial study identifies three broad types of wildlife related activities: wildlife activities around the home, cabin or cottage; indirect wildlife activities, which are away from the home but incidental to the main purpose of a trip or outing such as seeing wildlife while driving, hiking or picnicking; and direct wildlife activities, which occur away from the home and are the main purpose of a trip or outing. As part of the study, a household survey requested BC residents to indicate expenditures on the three types of wildlife activities.

Table 20 Expenditures on Wildlife Activities in B.C. for Selected Regions

Activity Type	Lower Mainland[1] $1996 ($ million)	Total B.C. ($ million)
Home/Cabin/ Cottage	$67.8	$122.1
Indirect Activities	$64.4	$107.5
Direct Activities	$171.6	$391.7
Total Expenditures	$303.8	$621.3

Notes:
1. Source: Roger Reid, *Economic Value of Wildlife Activities in BC 1996*, Tables 18,19 and 20.
2. Adjusted using Statistics Canada consumer price index, BC all items.

While gross expenditures give some indication of the economic impact and value of these activities, a better measure is the net economic value, which estimates net utility of these activities to participants engaging in them. This is measured by estimating how much more people would be willing to pay to engage in these activities, than they actually did pay.

The household survey employed a contingent valuation method to estimate net economic value by region as outlined in the table following.

Table 21 Net Economic Value from Wildlife Activities in B.C.

Activity Type	B.C. Net Economic Values[1,2] $1996	$ Per Day $1996
Direct Activities	$792 million	$44.40
Indirect Activities	$194 million	$2.62
Total	$986 million	$10.74

Notes:
1. Source: *Roger Reid, Economic Value of Wildlife Activities in BC 1996*, Tables 28 and 29.
2. Net Economic Value is consumer surplus, measured through a contingent valuation survey.
3. Adjusted using Statistics Canada consumer price index, BC all items.

The above estimates of expenditures and net economic values indicate that for direct wildlife activities in particular, the net economic value derived from the activity is far greater than its actual cost (B.C. residents spent an average of $22 per recreation day on direct wildlife related activities in 1996, but derived $44 per recreation day in net economic value from the activities)[43].

Appendix 6-6 Snowmobiling

Snowmobiling is a popular winter recreation activity in the North Cascades provincial forests and in the Granite Mountain area in the north east of the Cascade Recreation Area. Snowmobiling is not allowed in any of the Provincial Parks.

[43] Roger Reid, ibid, Tables 27 and 28.

Snowmobiling occurs throughout the North Cascades provincial forests, but some of the most well known areas include Thynne Mountain area, Coquihalla Pass, Coquihalla River and Stoyoma Mountain.

There are no recent direct data on snowmobiling participation rates for residents in and around the Recovery Plan Area. The 1994 Ministry of Forests Resource Analysis reports snowmobiling rates of approximately 4% for Lower Mainland residents and 7% for all of B.C.

There are a few snowmobiling clubs in the area including the Cheam Whiskey Jacks Snowmobiling Club based in Chilliwack, and clubs in Merritt, Princeton and Keremeos (Similkameen Snowmobile Club).

Snowmobiling is an important tourism draw for the B.C. Interior. Estimates of expenditures by snowmobiling tourists range between $85[44] and $225[45] per day. The higher estimate of $225 per day is based on a Snowmobile Strategy[46] conducted for the City of Revelstoke and it included only snowmobile tourists who stayed overnight. Average daily expenditures by visitors were: accommodation and meals $88 (39%), snowmobile costs $53 (24%), entertainment $50 (22%) and miscellaneous $33 (15%), for a total of $224 per non-resident day.

Appendix 6-7 Recreation Clubs and Associations

The following table lists various recreation clubs that have expressed an interest in the Grizzly Recovery Plan.

Table 22 Partial List of Recreation Clubs Operating in the Recovery Plan Area

Fishing / Hunting	B.C. Fishing Resort & Outfitters	Kamloops, B.C.
Fishing / Hunting	Chilliwack Fish & Game Protective Association	Chilliwack
Fishing / Hunting	Guide Outfitters Association of BC	Richmond
Fishing / Hunting	Hope Rod & Gun Club	Hope
Fishing / Hunting	Keremeos Fish & Game Club	Cawston
Fishing / Hunting	Nicola Valley Rod & Gun Club	Merritt
Fishing / Hunting	Otter Valley Fish & Game Association	Tulameen
Fishing / Hunting	Princeton & District Fish and Game Club	Princeton
Fishing / Hunting	Princeton & District Fish & Game Association	Princeton
Fishing / Hunting	Salmon Arm Fish & Game Club	Salmon Arm
Horseback Riding	Back Country Horsemen of B.C.	Kelowna, B.C.
Motorized	ATV/BC	Port Coquitlam
Motorized	B.C. Southcoast Allterrainers	Aldergrove
Motorized	Lionsgaters Four Wheel Drive Society	North Vancouver
Motorized	Okanagan Explorers 4X4 Club	Vernon
Motorized	Okanagan Jeep Club	Vernon
Motorized	Pacific North West Motorcycle Association (PNWMA)	North Delta
Motorized	Pacific Off Roaders 4X4 Club	Delta
Motorized	Trailseekers Off-Road Club	Princeton
Motorized	Four Wheel Drive Association of BC	Surrey
Motorized – Snowmobiling	Cheam Whiskey Jacks Snowmobiling Club	Chilliwack

[44] *Socio-Economic Overview of the Crowsnest Pass*, 2002
[45] *Revelstoke Snowmobile Strategy, 2002.*
[46] City of Revelstoke, *Revelstoke Snowmobile Strategy*, 2002, www.cityofrevelstoke.com/edc/snowmobile

Motorized – Snowmobiling	Merritt Snowmobile Club	Merritt
Motorized – Snowmobiling	Princeton Snowmobilers	Tulameen
Motorized – Snowmobiling	Similkameen Snowmobile Club	Keremeos
Motorized – Snowmobiling	Summit Seekers Snowmobile Club	New Westminster
Outdoor	Chilliwack Outdoor Club	Chilliwack
Outdoor	Coalmont Adventures Club	Coalmont
Outdoor	Commercial Backcountry Tourism	Gold Bridge
Outdoor	Federation of Mountain Clubs of BC Trails Committee	Vancouver
Outdoor	Harriet Guild Valley Outdoor Association	White Rock
Outdoor	Historical Trails Committee	Vernon
Outdoor	Hope Outdoor Club	Hope
Outdoor	Manning Park Outdoor Club	Hope
Outdoor	Nickle Plate Cross Country Ski Club	Penticton
Outdoor	Penticton Outdoors Club	Penticton
Outdoor	The Trails Society of BC	Vancouver
Outdoor	Timberline Cruisers Club	Princeton
Outdoor	Timberline Snowgoers Club	Princeton
Outdoor	Vermilion Trail Society	Princeton

APPENDIX 7 BACKCOUNTRY COMMERCIAL OPERATIONS

This appendix assesses the socio-economic significance of backcountry commercial operations. This includes guided hunting, guided angling and adventure travel operators.

Appendix 7-1 Guided Hunting

The Recovery Plan reports that there are 3 guide outfitters that currently operate in the North Cascades area, although the Ministry of Water, Land and Air Protection (MWLAP) reports that 4 guide outfitters have rights to operate in the management units that form the North Cascades. According to MWLAP, all 4 guide outfitters also operate in management units outside the North Cascades.

In B.C. guide outfitters are required by regulation for out-of-province hunters. While guided hunting is the primary product offered by these operators, many also offer wilderness adventure and wildlife viewing tours outside of major hunting seasons. The BC MWLAP hunting effort data show that based on 1990 to 2002 data, average annual non-resident hunting effort for the North Cascades area account for 201 hunter days, 32 big game kills and 47 hunters (see Appendix 6).

The following table shows the economic parameters for all guide outfitting operations in B.C. The table also shows the same data for the North Cascades area based on the 201 hunter days estimated for the North Cascades for non-resident hunters. The guideoutfitters who operate in the North Cascades would have higher income than is indicated in the following table as they also operate in management units that are outside the Recovery Plan area.

Table 23 Economic Parameters of Guide Outfitting in BC and the Recovery Plan Area

Per Annum	B.C. Guide Outfitters	Units	Recovery Plan Area	Recovery Plan Area as a % of B.C.
Number of Guide Outfitters	231	Outfitters	3 or 4	1.2% to 1.7%
Hunting Clients	4,833	Hunters	47	0.97%
Hunting Days	51,713	Days	201	0.39%
Hunting Days per Client/ Hunter	10.7	Days	4.3	
Average Percentage				0.68%
Hunting Revenues	$32.0	million	$217,786	0.68%
Other Revenues	$8.0	million	$54,447	0.68%
Total Revenues	$40.0	million	$272,233	0.68%
Wages and Salaries	$16.0	million	$108,893	0.68%
Tips & Gratuities @ 7% Gross Revenues	$2.8	million	$19,056	0.68%
Government Revenues	$4.9	million	$33,349	0.68%
Net Economic Value	$7.84	million	$53,358	0.68%
Person Years of Employment	600	PYs	4 PYs	0.68%

Notes:

1. Source: G.S. Gislason & Associates, *The Guide Outfitting Industry in BC, An Economic Profile*, BC Ministry of Sustainable Resource Management, 2002.
2. The Recovery Plan Area Total is based on 201 hunter days for big game species.
3. Government revenues include Guide and Assistant Guide Fees, Guide Royalties, Client Hunting Licences, Client Hunting Tags, Land Tenure, Park Use, Water Licences, Grazing Licences and Property Taxes. Income Taxes are not included.
4. Net Economic Value is calculated as Government Revenues plus 5% of wages, salaries and gratuities (assumed economic rent to labour) plus 5% of Total Revenues (assumed economic rent to capital). An estimate of Consumer Surplus to the hunters is not included as the hunters are not residents of BC.

The B.C. MWLAP hunting effort data show that non-resident hunting in the North Cascades is not significant when compared with resident hunting for the same area. For example, the North Cascades attracts 1.3% of all non-resident black bear hunters in the province, which is comparable to the North Cascades share of the B.C. landbase of 1%, but is considerably less than the 7% share of resident hunters.

Guide outfitting territory tenures confer upon the licensee exclusive use of a territory for guided hunting operations (but not for recreation or other commercial uses of the land). The exclusive nature of these tenures, coupled with the requirement that non-resident hunters must use the services of a licensed guide, has generated economic rent that is capitalized in the value of these transferable tenures. Recent sales of these tenures have indicated values for the licenses of up to $1 million in some parts of B.C. (exclusive of hard assets such as lodges, cabins and equipment).

Appendix 7-2 Adventure Travel

There are commercial lodges and operators that offer adventure tours in the North Cascades. The main activities include:

- River Rafting: The North Cascades area includes river rafting operators that offer motorized inflatable tours of the rapids and whirlpools on the Fraser River between Boston Bar and Yale, as well as on the Chilliwack River.

- Guest Ranches and Horseback Riding: There are 4 or 5 guest ranches that offer horseback riding tours in the North Cascades. Some also offer snowmobile tours in the winter. While horseback riding does occur in the North Cascades, the most commonly popular region in B.C. for guest ranches are north of the Recovery Plan area, in the Merritt region and in the Cariboo region.

- Adventure touring companies: There are 4 or 5 backcountry tour operators that offer adventure tours in the North Cascades. These include an operator based in Tulameen that offers snowmobiling, ATV, hiking, bike shuttle and other services, and another based in Princeton that offers dog sled tours in the winter, and backcountry hiking tours in fall and spring.

- Adventure lodges and resort type accommodations that offer a variety of frontcountry and backcountry opportunities to their visitors. These include Manning Park Resort and Cathedral Lakes Resort in the Provincial Parks. Coquihalla Lakes Lodge & Cabins on the Coquihalla Highway near the toll booth site focuses on snowmobilers during the winter. Other lodge and/or cabin operators have facilities on lakes and offer boat rentals, snowmobile rentals and other services to their visitors.

- Equipment rental and other businesses that service backcountry tourists. There are other small businesses, which are based in or near the North Cascades area that rent bicycles, boats, and other equipment to visitors to the area.

There are no heli-skiing or heli-hiking operators that offer tours in the North Cascades. The potential for heli-skiing is viewed as limited.

The following table summarizes the types of activities, number of operators and approximate

revenues that might be generated from the North Cascades in commercial backcountry tourism. The intent of these estimates is to provide a rough idea of the magnitude of impacts and should therefore be viewed as very approximate.

Table 24 Socio-Economic Impacts of Adventure Travel Operators in Recovery Plan Area

Description of Activity	Number of Operators (may offer more than one activity) (note 1)	$ per Client Day (note 2)	Gross Revenues per Operator (note 2)	Estimated Recovery Plan Area Revenues from Activity
River Rafting, Canoeing, Kayaking	Approx. 4 river rafting operations operate tours on Fraser River & Chilliwack River (assume 2 large operators and 2 medium size operators)	$140 to $150 per day	For major operators, $500,000 (2,000 client days @150 per day & 500 days @ $400 per day); for medium size operators, assume $250,000 each	Assume one third of business is from rafting in Fraser River $500,000 (excl. revenues from Thompson River and other rivers)
Horseback Trail Riding	Approx. 4 guest ranches (may not be based in North Cascades but tours may be at least partly in GBPU)	$200 to $300 per day (note 5)	$100,000 (500 client days @$200 per day)	$400,000
Snowmobiling/ Dog Sledding & Other Winter Touring Activities – very popular for snowmobiling	One operator focuses on snowmobiling tours; one operator focuses on dog sledding tours with ATV tours in Spring & Fall	$300 per day (note 3)	$100,000 for large operators and $50,000 for smaller operators	$200,000
ATVs, Motorbikes, and Other	Potentially one or two other operators that focus on providing tours using ATVs and other motorized tours throughout the region (excluding above operators)	$200 to $250 per day	$50,000 for smaller operators	$50,000
Mountain Biking/ Hiking/ Wildlife Viewing/	Potentially one or 2 other operators that focus on biking, hiking and other adventure tours in the North Cascades	$150 per day	$100,000 for large operators, $50,000 for small operators	$50,000
TOTAL (estimate)	Approx. 4 for river rafting and 8 others			Approx. $500,000 from river rafting and $700,000 for others

Notes:

1. These assumptions are based on: Stuart Gale & Associates and Pierce Lefebvre Consulting, *Building Block for Economic Development & Analysis, Land Based Ecotourism*, draft dated January 31st, 2003.
2. Estimates for gross revenues from guided snowmobiling activity are based on ski-touring operators and the fact that the cost of guided snowmobiling is $300 per day (Jamieson, 2003) whereas guided ski-touring rates are $190 per day.
3. There are no building blocks for ATV touring activities.
4. Stuart Gale & Associates et al, $200 per day whereas Jamieson indicates $300 per day.

The following table provides a very rough estimate of the annual Net Economic Value from adventure travel commercial operators in the Recovery Plan.

Table 25 Net Economic Value from Adventure Travel Operators in Recovery Plan Area

	River Rafting	Other Operators
Revenues From above table	$500,000	$700,000
Wages and Salaries: 25% of revenues (note 1)	$125,000	$175,000
Public Sector Fees (assume $1,000 per operator, exclude room tax for lodge (note 2))	$4,000	$8,000
Annual Net Economic Value ($)		
• Public sector rent	$4,000	$8,000
• Labour rent – say at 5% of wages	$6,250	$8,750
• Industry rent – say at 5% of revenues	$25,000	$35,000
Total Net Economic Value	$35,250	$51,750

Notes:

1. Wages and salaries are based on the following: river rafting: 20%, horseback trail riding: 28%, multi-day hiking: 30%, ski-touring: 28%, bike touring: 22%-25% and lodges: 25.8%; Source: MSRM, *Building Block, Land Based Tourism*, 2003 and *Building Block-Commercial Lodges and Camps/Huts*, July 2002.
2. Government fees and permits can range from $500 to up to $3,000 for larger adventure tourism operations; above estimates exclude lodge operations and as a result, exclude the room revenue tax of 8%.

APPENDIX 8 DEMOGRAPHIC DATA

The following tables provide demographic data for the Recovery Plan area.

Table 26 First Nations On-Reserve Population in Recovery Plan Area

	2001 Population	Private Dwellings	Land Area (sq. km.)
Fraser Valley			
Albert Flat 5	21	8	0.87
Aywawwis 15	0	2	0.98
Boothroyd 5A	0	0	0.78
Boothroyd 8A	0	0	0.59
Boston Bar 1A	5	2	0.61
Bucktum 4	5	1	0.29
Chaumox 11	0	0	0.64
Cheam 1	212	76	3.64
Inkahtsaph 6	5	1	2.06
Kahmoose 4	65	25	0.22
Kopchitchin 2	50	16	1.38
Kuthlalth 3	0	0	1.39
Ohamil 1	64	22	2.13
Peters 1	44	17	1.87
Popkum 1	0	3	1.38
Puckatholetchin 11	5	2	2.43
Saddle Rock 9	5	1	0.39
Schelowat 1	5	3	0.93
Sho-ook 5	0	0	1.67
Skowkale 10	267	109	0.59
Skowkale 11	186	102	0.11
Soowahlie 14	234	75	3.84
Speyum 3	0	1	1.45
Spuzzum 1	50	16	1.36
Stullawheets 8	40	20	0.53
Swahliseah 14	0	0	0.92
Tuckkwiowhum 1	37	12	0.53
Tzeachten 13	683	317	2.13
Yakweakwioose 12	42	14	0.22
Yale Town 1	17	7	0.14
Sub- Total	2,042	852	36.07
Okanagan-Similkameen			
Alexis 9	15	6	1.88
Ashnola 10	62	20	34.18
Chopaka 7 & 8	48	23	17.19
Chuchuwayha 2	65	26	21.7
Lower Similkameen 2	48	16	13.78
Sub- Total	238	91	88.73
Thompson-Nicola			
Inklyuhkinatko 2	48	15	0.63

	2001 Population	Private Dwellings	Land Area (sq. km.)
Kanaka Bar 1A	53	13	0.82
Kanaka Bar 2	10	6	0.52
Nickeyeah	15	7	1.02
Nicomen 1	42	17	0.68
Shaken 11	66	30	25.39
Siska Flat 3	95	27	0.46
Siska Flat 5A	0	0	0.23
Siska Flat 5B	0	0	0.15
Siska Flat 8	34	14	0.23
Skwayaynope 26	5	2	0.93
Staiyahanny 8	0	0	0.36
Zacht 5	10	6	0.27
Sub- Total	378	137	31.69
Grand Total	2,658	1,080	156.49

Source: BC Stats, B.C. Ministry of Management Services, *British Columbia Indian Reserve Census Figures Including Estimates for Un-enumerated Reserves*, from 2001 Census of Canada, 2002.

Table 27 Population in Local Health Areas Covering Parts of Recovery Plan Area

Local Health Area	2002 Pop.	Land Area (km2)	1992-2002 Population Growth Rate
Hope-32			
Hope	6,521	41	
Rest of Region	2,195	5,470	
Total	8,716	5,511	0.9%
Merrit-31			
Merritt	7,549	25	
Rest of Region	3,967	6,476	
Total	11,516	6,501	0.9%
Princeton-17			
Princeton	2,692	10	
Rest of Region	1,986	4,784	
Total	4,678	4,794	0.0%
Keremeos-16			
Keremeos	1,264	2	
Rest of Region	3,601	2,450	
Total	4,865	2,452	2.0%
Chilliwack-33 Excluding Municipality			
Rest of Region	7,813	1,046	2.7%
Region Totals			
Towns	18,026	79	
Rest of Region	19,562	20,225	
Total	37,588	20,303	
B.C. Totals	4,141,272	934,169	1.9%
Region % of B.C.	0.91%	2.17%	
North Cascades Area		9,807	
% of Region		48%	

Note: Some 67,000 people reside in the municipality of Chilliwack and these have been excluded.
Source: BC Stats, Statistical Profiles for Local Health Area 16-Keremeos, 32-Hope, 31-Merritt, 17-Princeton and 33-Chilliwack, 2002.

Table 28 Population in and Near the Recovery Plan Area

	1996	2001
On Boundary of Spine		
Hope	6,247	6,184
Boston Bar	322	233
Lytton	322	319
Princeton	2,826	2,610
Tulameen	n/a	n/a
Coalmont	n/a	n/a
Sunshine Valley	103	164
Within Spine		
Eastgate	n/a	n/a
Othello (1)	42	42
Sub-Total Spine	9,862	9,552
Outside Spine Within North Cascades:		
Chilliwack Lake (1)	200	200
Various in Chilliwack LHA (2)	1,900	2,026
Outside North Cascades but Close Proximity:		
Hedley	324	272
Keremeos	1,167	1,197
Yale	184	171
Merritt	7,631	7,088
Total	21,268	20,506

Notes:
1. 1996 estimates are from: Recovery Plan for Grizzly Bears in the North Cascades of B.C., draft of 2003, page 51; assumed no change between 1996 and 2001.
2. Includes the communities of Cultus Lake, East Popkum, West Popkum, Laidlaw and Sleese Park, which are all small communities in the Fraser Valley near Chilliwack.

Source: Statistics Canada, Canada Census, 1996 and 2001.

APPENDIX 9 SOCIO-ECONOMIC IMPACT PARAMETERS BY ACTIVITY

The following table outlines some of the socio-economic impact parameters estimated for various industrial and recreation activities occurring, or potentially occurring, in the Recovery Plan area. These estimates are derived from data presented in Appendices 2 through 7 of this report. In many cases the **estimates are very speculative**, and presented only to give the reader a very rough idea of the magnitude of socio-economic impacts these activities might generate. Not all of the activities mentioned elsewhere in this report are included individually in this table.

Table 29 Socio-Economic Impact Parameters by Recovery Plan Activity

	Annual Gross Revenues/ Expenditures per Year	Direct Jobs	Net Economic Value
Coal, Metals and Minerals:			
• Mineral Exploration	$0.2 million (2002 expenditures)	10 direct PYs of employment based on 22 year average in expenditures	$40,000 in labour rent (based on $50,000 per PY, 16 PYs & 5% labour rent); no estimates for industry rent and public sector rents
• 3 Operating Mines/ Quarries	N/A	6 PYs	
Energy:			
• Coalbed Methane & Independent Power Projects	None at this point Some potential	None at this point	Potential
Forestry			
• Spine area	N/A	758 PYs (Spine Area)	$15.7 million (Spine area)
Agriculture			
• Spine area	N/A	321 Jobs (Spine Area)	$568,000 (Spine area)
Recreation & Tourism			
• Provincial Parks and Recreation Areas	$34 million in visitor and park expenditures	583 PYs (from park operations & visitor exp., includes direct, indirect & induced); direct PYs not available	$5 million from 146,957 camping visits; estimate from 1.36 million day use visits not available
• Provincial Forests	In B.C., recreation visits to provincial forests are at least as high as visits to Parks and Recreation Areas	N/A	N/A
• Resident Hunting	N/A	N/A	$1.4 million per year ($1 million in the Spine area, $0.4 million outside the Spine)
• Resident Angling	N/A	N/A	N/A
• Wildlife Viewing / Hiking	N/A	N/A	N/A
• Snowmobiling	$85 to $225 per day per tourist	N/A	N/A
Backcountry Commercial			
• Guided Hunting	$108,893	4 PYs	$53,358
• Adventure Travel Lodges	N/A	N/A	N/A
• Adventure Travel Operators	$1.2 million	N/A	$87,000

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